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The Physician and Public Health Officialdom*

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THE physician is, for most people, still the key-man in all matters affecting health. From the earliest times he has offered, for those whose confidence he held, the last word concerning death and disease. The aphorisms of ancient sages invariably affirm this fact. The texts of Hippocrates are as much concerned with the prevention of disease as with its diagnosis and treatment.

The vast majority of medical practice is individual. It concerns the diagnosis and the treatment of ailments which affect the individual human being. Perhaps the outstanding fear in relationship to disease is the fear of pain. Pain is a subjective sensation affecting individuals and not masses of men. Before the bacteriological epoch in medicine physicians were little, if at all, concerned with disease as it affects masses of mankind. However, the establishment by Pasteur of the germ causation of disease brought to light knowledge of the dissemination of infectious disease. This new information took the prevention of some infectious diseases out of the hands of the physician and placed it in the hands of the community. This was logical, since it was by and through the community that the disease was spread, and since it was more feasible to prevent disease by and through the community than through the individual.

A large part of this problem has, of course, been associated equally with the change from rural to urban methods of living. The individual who lives alone; who obtains his food from the soil surrounding his cabin, his water from a deep spring at his door; and whose only contacts are with the members of his own family, is less likely to suffer contagious or infectious disorders than the one who is housed in one of these great barracks, called by courtesy "apartment houses," who obtains his milk from a farm hundreds of miles away, the milk having passed through the hands of innumerable carriers and processors before it reaches him; who travels daily to his office in a crowded public conveyance; who seeks his amusements in crowds of thousands in movies and tens of hundreds of thousands in baseball and football games; and whose food comes from four corners of the world,

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through the hands of many men. Such an individual is constantly affected so far as disease is concerned by his contacts with those about him.

Thus new knowledge of infectious diseases and their modes of transmission has emphasized the work of the public health official. Health departments became at once responsible for pure water supplies and pure milk supplies, for the disposal of sewage, for the control of foods, and for the study and control of food handlers. The development of the knowledge that tuberculosis might be spread by contaminated sputum spread carelessly about in public places, the knowledge that water from a contaminated well might bring on in the community a devastating typhoid epidemic, the knowledge that an infected milk supply might mean thousands of cases of septic sore throat, made the public aware of the fact that it needed the protection of its health against careless and irresponsible members of the community. Health officials were given police powers for controlling those who too lightly carried their individual responsibilities. Most of us can remember the time when the public health official was more a policeman than a scientist; when he travelled about with a club and a star forcing the closing of wells, forcing the straining and pasteurization of milk, forcing isolation and quarantine for infectious diseases.

Gradually, in connection with the development of our knowledge of immunity, came the possibility of immunization against infectious diseases of various types. Before immunization could be applied on a mass scale to human beings, it became necessary to teach them the importance and significance of these measures. The campaign for vaccination against smallpox, the first of the important measures for immunization, was not difficult in its early stages, primarily because the vast majority of human beings feared smallpox more than any possible results that might come from vaccination. Fear is for most human beings a compelling motive. Once the nations of the world realized the value of vaccination against smallpox, it was not difficult to obtain in most countries legal measures to make vaccination against smallpox compulsory. It is perhaps significant that in the United States today our incidence of smallpox, because of the number of the unvaccinated, is far greater than that of many other civilized countries. The reason lies no doubt in the fact that smallpox has been brought largely under control by rather general vaccination and compulsory quarantine. There are philosophers among us who feel that it might be worth while to relax our efforts temporarily in order to strike fear again into a generation that is unaware of the lesson of the past. In times of epidemic when fear again strikes a community, it is not difficult to secure vaccination of vast numbers of people, whether by officials of departments of health, by industrial physicians, by school physicians, or by individual practitioners.

There are, however, new procedures in immunology of which the public is not yet aware. One of the problems of those interested in public health including both physicians and the public health officials is the means of impressing on the people the importance of immunization. Coincidental with the rise of our knowledge of the prevention of disease has come a tremendous advance in methods of educating the public. The travelling quack of an earlier day would speak at night to a few hundred people who surrounded his wagon on some city lot. In the course of some years he might have visited several hundreds of cities. The charlatan of today is bound by no such limitations. He reaches his public through all the means of dissemination of

knowledge that have been developed—the radio, the newspapers, the periodical, the direct-by-mail circular, the public address, and similar devices. These enable one who has a message to reach millions of people at a single time. Many officials in the field of public health have learned to avail themselves of these devices for the education of the public. For this purpose also new methods of education have been developed. The demonstration clinics are a practical lesson in medical methods. Their purpose is to educate the public in the value of some method in order that thereafter the public may go directly to the medical profession to obtain such service.

Whereas the prevention of disease two centuries ago was a matter between the physician and his patient, today the prevention of disease is a tremendous industry embracing the services of hundreds of thousands of persons, embracing knowledge derived from all of the special branches of science known today. The engineer, the biologist, the laboratory diagnostician, the educator, the physician, the physicist, and the chemist, all combine to make available information from their sciences for the public good. When such coöperative knowledge is required there must obviously be some center as a common meeting place, some headquarters for the placing of apparatus and materials, some executive head for coördination of effort and application of results. This obviously is the public health office of today. It would be apparent to anyone that the individual physician cannot in every community undertake to make available for disease prevention and its control all of the services that have been mentioned. The duty of the public health official in this connection is clear.

Where then does the cleavage come? How are the duties, the obligations and the prerogatives of the physician in the field of public health to be separated from those of public health officialdom?

It is conceivable that a complete application of the mass handling of man might make it possible, even though not desirable, that all of the care of the sick and the prevention of disease among the well, be turned over to some official authority. This, which would represent the complete application of state medicine, is, I believe, recognized by all but a few fanatical adherents of the handling of men in a mass to be a most undesirable situation—one likely to result in nothing but ill for the human race. As long as human beings have individual minds and individual bodies with different constitutions, their happiness will not tolerate any such total disregard of their individualities. However, as has already been shown, there are certain aspects of disease prevention which the individual cannot undertake for himself and which must inevitably be assumed by public authority.

The family physician is so called because he concerns himself with keeping intimately in touch with all of those aspects of the lives of his patients in their families that may be concerned with health and disease. More and more emphasis is being placed on constitution and heredity as significant factors in the incidence of disease. It is known that man's resistance to disease depends as much on the quality of his constitution as on his opportunity to come into contact with infection. It is known that there are many disorders which tend to appear in families, of which no doubt the allergic and arthritic types of disease represent the most frequent forms. It is known that some families tend to be hypertensive, all having high blood pressures, and other hypotensive. The physician who has cared for grandparents and for parents knows what to anticipate in the children. The physician who has himself witnessed the birth of a child, who has

followed it through the first year of life, knowing the manner of its feeding and its nutrition; the physician who has taken the child through the various vicissitudes of childhood and adolescence, including all of the common contagious diseases; is far better able to judge the severity of the diseases that come on in middle life than one who sees his patient for the first time.

Many a physician today continues to combine those functions of priesthood and healer which were combined in the vocation of physicians in prehistoric times. Why then should any public health officialdom attempt to take from this family doctor the responsibility for individual prevention of disease that resides in the administration of preventive vaccination against smallpox, preventive inoculation against diphtheria or scarlet fever, or any of the other infectious diseases? Why suggest, as has already been done, that periodic physical examinations are best made by health departments or commercially organized groups? Why should public health officialdom assume that it is better to have children examined prior to their entrance into school in a large clinic under the supervision of the clinic head, or in a school clinic under the supervision of a salaried employee, than in the office of the individual physician? The cursory examination made available in such mass application of the ideals of preventive medicine cannot begin to compare in efficiency or in usefulness for prevention of disease with the type of study made by the individual physician in his office or in the patient's home. Obviously the factor which most concerns the socially minded leaders in the field of public health is the factor of expense. Public health officialdom recognizes that it is possible to examine a large number of children routinely at a smaller expense than the same procedure would cost if made in the physician's office. Nevertheless, even though the individual examination costs more, it is worth more. Further, the more that such procedures are delegated to official agencies, and the more people come to believe that medical care in whole or in part is the function of the state, the sooner will we approach that period when an attempt will be made to delegate all medical care to state agencies.

No doubt the charge that is frequently made that it has been necessary for public health officialdom to take over the field of preventive medicine because physicians have neglected this aspect of their work, is made with some foundation. During the period of inflation, in the seemingly golden years of 1928 and 1929, few physicians were greatly concerned with problems of preventive medicine. When urged to examine the well, they were likely to say that practically all of their time was occupied with the care of the sick. It is reasonable to believe, however, that one of the benefits of the present period of financial depression is the realization in the minds of most physicians that they must practise preventive medicine increasingly in the future if they are not to lose the practice of curative medicine. Physicians of the past have been too readily content to leave all of the practice of preventive medicine to public health officials and to take it for granted that the duties of the public health department were being satisfactorily performed.

It is an aphorism that the bureaucrat invariably grasps more and more in the way of duties and obligations, knowing that his advancement depends largely on the expansion of his office. Thus when money is available the budgets of bureaus of all types expand constantly. It is with the greatest of difficulty that they are decreased in times of financial depression. Here again the financial depression may be said to have resulted in beneficial effects

in that it caused most public health officials to take account of their budgets, to study the expenses of their departments, and to limit their services to well established, essential public health procedures which could not be properly handled in other ways.

As budgets began to be restricted, public health officials began to discontinue many of the proper functions of the medical profession which they had taken over. Some exuberant child welfare departments fell by the wayside; school clinics for treating disease and for removing tonsils and adenoids in wholesale lots, began to disappear; house-to-house canvasses for all sorts of interesting investigations were temporarily postponed. More and more public health officials began to depend on their educational functions to enlighten the public as to the possibilities of preventive medicine, and to urge people to go to their family physician for such individual preventive medicine as these family physicians could well practise.

While it was no doubt the exigencies of the situation that compelled many public health departments to modify their functions in this manner, some enlightened health commissioners had already foreseen the possibilities. In Detroit particularly, Vaughan had realized the necessity of drawing the physician more and more into public health work. Today the so-called Detroit Plan is being accepted by both physicians and public health officials as probably the ideal method for securing a coöperative effort leading to the control of a specific infectious disease. Briefly, the plan inaugurated in Detroit in 1928 involves the participation of the general practitioner in public health procedure. Under this plan, patients are urged to go to their own doctors for preschool examinations and for immunization against diphtheria; and funds are paid from the health department to individual physicians for carrying on this preventive medical work. Among the beneficial outcomes have been the reduction of diphtheria to one-fourth the incidence prior to the campaign, a changed attitude of the public toward the health department, and elimination of much antagonism by the medical profession toward the work of employees of the department of public health.

The plan has provided an opportunity for the general practitioner to review his knowledge of infectious disease and to obtain additional information through postgraduate conferences with health officials on the control of communicable diseases. By this enlistment of coöperation the office of every physician is made an educational center, a place to which mothers may come in order to obtain simple inoculation against diphtheria, but in which at the same time they learn the value of physical examinations, the importance of taking care promptly of preventable defects, and the significance of proper hygiene and nutrition. Perhaps, most important of all, people may thus be impressed directly with the desirability of having early competent medical advice in care of all types of disease.

Throughout the country there are many physicians who already have realized the importance of such preventive medical activities on the part of the family practitioner. Thus in Maryland one family doctor requested and secured from the Health Department the printed literature and forms designed to assist in teaching parents the necessity for diphtheria prevention. In 8 months he completed toxoid inoculation of a total of more than 180 children in his own family practice, and at the time of writing had given the first dose to 95 more children. During the same period other physicians had inoculated 526 children according to the records of the department.

In these times it would be well if

every leader in the field of public health would ponder carefully an address made by Sir Josiah Stamp, an eminent British authority in the field of economics to a recent congress on economic problems. He concerned himself with the "Economic Test of the Limits of Public Health."[1] After all, the money available to any community for public health purposes must be balanced against moneys needed for other causes. So intimately is health bound up with food, fuel, housing, safety and similar problems, that every executive and administrator must consider all of these objectives in apportioning the items in his budget. A free clinic for the treatment of venereal disease is no doubt a handsome appurtenance to every civilized community, but everyone will grant that the feeding of starving children should take precedence. Daily sprinkling and sweeping of all city streets would be esthetically desirable even though impossibly costly, but bacteriologic control of water supply and sanitary disposal of sewage are absolutely necessary for the continuation of life. A radio in every room in the hospital will help to free the hours from care for a good many sick people, but if the employment of a radio technician, and the purchase and upkeep of the equipment takes the place of providing a resuscitation apparatus in the operating room, it may well be avoided.

A distinguished leader in the field of public health has urged that it is uneconomic to turn over any of the functions of full-time health departments to medical practitioners. Nevertheless, one must in these times of stress and turmoil revaluate all types of public service. The medical profession is revaluating the methods and procedures used in the diagnosis and treatment of disease with a view to limiting their practices to the items that are essential. Similarly public health departments must revaluate their services to include the essentials so far as concerns prevention of disease among the public as a whole, and leave to the medical profession the practice of preventive medicine as it concerns the individual. Since the report of the Committee on the Costs of Medical Care has been gradually languishing into innocuous desuetude the trend of both preventive and curative medical practice has been toward greater individualization in the diagnosis and treatment of disease.

It is not only in the field of medicine that problems have arisen in these times relative to the manner of conduct of human affairs. Attempts are being made in every industry and business to bring some order out of the chaos into which the machine age, mass methods of living, and the work of the so-called efficiency engineers have brought us. Those who have witnessed at first hand the efforts that have been made during the last decade to bring out of the involved situation that exists in the care of the public health, some definite order, will recognize the necessity that exists for establishing more definitely the line of relationship between official and nonofficial health agencies and the medical profession. If one were at this time to seek the primary disturbing factor in the situation it would undoubtedly be the last mentioned group—namely, the nonofficial health agencies. One is concerned here as in the field of medical education with what has been aptly called "the curse of philanthropy." Since the time when the Rockefeller millions were first placed at the disposal of the International Health Board, medicine has been peculiarly the pet of philanthropy. In various surveys of philanthropies and foundations, this fact has been clearly established. Billions of dollars have been placed at the disposal of various funds and foundations for the investigation of problems in the field of medicine and for prevention of disease. It would be

unreasonable to conclude that all of this money has been wisely spent. Indeed it is possible to show beyond any shadow of a doubt that many millions of dollars have been wasted. Moreover, there is adequate evidence to indicate that meddlesome interference in the conduct of public health work by these nonofficial agencies has in some parts of the country completely disrupted public health departments; has brought about intense antipathies between physicians and public health officials who must obviously work in the closest harmony to secure the best results; and, on other occasions, has made the care of the public health a football of politics.

As has been said previously, much, if not the greater part, of our knowledge in public health during the last 50 years has been the result of movements initiated in communities by physicians and carried forward by physicians until the time when they had achieved sufficient force and volume to demand the creation of special departments or bureaus for their control. Many of the discoveries on which preventive work is based were contributed by physicians. Doctors conceived the antituberculosis movement; medical societies in many instances petitioned state legislatures for the creation of state boards of health; the medical profession has initiated in the past and continues to propose constructive legislation for the public health.

The medical profession has not been content with raising the standards of medical education, improving the quality of proprietary medicines, fighting quacks within its own ranks as well as without, and aiding in the development of the modern hospital; but has taken an active part in creating organizations, both governmental and voluntary, designed to improve the public health. Then, unfortunately, it has too often allowed these organizations to become alienated from medical guidance and advice. In consequence, some workers in the field of public health have forgotten or overlooked the importance of the medical profession. They have designated themselves as specialists and their field of endeavor as a specialty, but they have failed to recognize that public health is a specialty of medicine. True, a well-rounded public health program requires nurses, engineers, technicians, and educators; but all these must be guided by underlying medical principles. Significantly, perhaps partly as a result of economic stringency, now that adequate budgets are hard to get and public services which have been regarded as essential because long established are threatened, workers in public health are turning back to the medical profession.

The medical profession has always stood, and still stands, in favor of public health work of the right kind, properly conceived, correctly organized, and competently directed, for the better health of the community. The medical profession does not feel obligated to endorse unwise, visionary, or inefficient projects merely because they are launched in the name of the public health. Because it does not hesitate to speak out against abuses, it has been unjustly accused of obstructing progress. But all motion is not necessarily progressive. In times of economic stress, public health work is of special importance. If epidemic scourges such as typhoid, diphtheria, yellow fever, malaria, and smallpox, held in check by preventive measures, were to be added to our financial difficulties at this time, the result might well be disastrous. The absence of epidemic plagues has been one of the principal contributing factors to low depression death rates.[2]

The physician of the future must be increasingly a practitioner of preventive medicine. Obviously this involves new relationships to the public and to the

health official. Under various forms of state practice, problems have arisen which were discussed by Sir George Newman, K.C.B., M.D., F.R.C.P., chief medical officer of the Ministry of Health, who in his capacity as president addressed the Section on Public Health at the centenary meeting of the British Medical Association.[3] He pointed out that in no previous age has there been such growth of the conception of preventive medicine as in the present era, paying tribute to Bright, Addison, Hodgkin, Gull, Jenner, Osler, Allbutt, and Barlow for the constructive service that has been rendered in the great march of preventive medicine by medical practitioners. "It is they," he said, "who have made the bricks, found the road, explored the facts, carried on the fight, and educated the people in a way of life." He elucidated further: "They searched into the circumstances of disease and related it to environment; they introduced medical notification and hospital isolation; by their investigation of factory conditions they initiated industrial welfare; they stemmed the rising tide of spirit drinking; they began the reformation of midwifery and were the first to attack the problems of child sickness and mortality; they established dispensaries and staffed the new hospitals; their systematic support of vaccination instituted the practice of immunity; and their scientific observation was the beginning of British epidemiology."

If one were to seek any gross division of obligations and prerogatives as applied to the relationship of the physician and public health officialdom to the problem of preventive medicine, the line of demarcation most apparent is that between procedures applied to the individual and those applied to the community. Problems of both preventive and curative medicine as they affect the indigent must perforce be community problems. Yet even these may well be handled individually by physicians when they concern individual human beings, leaving it to the community, as is already done in many places, to provide the means. Under such a gross demarcation any form of preventive inoculation should logically be referred to the individual practitioner, except in times of epidemic when compulsory inoculation might have to be carried by the State. Under such a demarcation, periodic physical examinations, including not only the examinations of adults but also preschool and school examinations of children, would also be assigned to the family doctor, whereas by contrast special examinations for industry, special examinations for army, navy or other public appointments, and the examinations of food handlers might well come within the purview of a department of health. Even in the case of food handlers, however, a suitable system of certification in which the employer would be made responsible for maintaining the good health of his employees might work out more satisfactorily.

As has been mentioned, isolation and quarantine, sewage disposal, control of milk, water, and food supplies generally, ventilation of public buildings, and all of those aspects of preventive medicine included under sanitary engineering, would come logically under the auspices of the department of health.

There is one aspect of the work of the departments of health which has been largely developed within the last 10 years and which must increasingly become a function of any well organized department. I refer, of course, to education of the public in elementary personal hygiene, education of the public as to basic facts in the diagnosis of diseases and the fundamentals of good medical care. Some of the departments of health in our large cities and some of the state departments of health which

are most progressive have already developed these functions to a point which constitutes an adequate demonstration of the merits of this phase of their work. On the other hand, a great many departments have lagged behind or have embarked on such amateurish attempts to utilize public education and information as to open themselves to ridicule by those competent in this field. Unless means are found for suitably educating and developing an adequate personnel for this purpose the time may yet come when great departments of health may find it necessary to engage the talent of advertising agencies, of writers and publicists, as well as other professional persons, to develop suitably this phase of their work.

It is significant that the American Public Health Association itself has realized the importance of this new function, and that it has created special sections for their discussion in its annual sessions and a special department in its *Journal* for the promulgation of methods and ideas. It is obvious that the individual physician may be to some extent a competent educator of his individual patients, but it is equally obvious that he cannot carry daily and constantly to the vast majority of people the amount of health information that can be put forth by an active and competent department of health.

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Children's Weight During Economic Disturbances

A STUDY on School Children in Hagerstown, Md., conducted (1) each year between 1921 and 1927, and (2) in May, 1933, gave the following results:

1. Average weight of children in the two periods presents no consistent or statistically significant differences.
2. The variability of body weight (measured by the standard deviation) is not, for boys, consistently different for the two periods. For girls, body weight is slightly more variable in 1933 than in 1921–1927.
3. In the totals of 1,245 boys and 1,269 girls weighed in 1933, there are 4 fewer boys and 41 more girls who are 12 per cent or more below average weight than would be expected had the same proportions been underweight as were found in the 1921–1927 period.

From these findings it may be concluded that there is substantially no change in the weight of boys, and a slight increase in the number of underweight girls, during the last few years of the economic depression.

Hagerstown is not representative of the most severely stricken type of community. It is a typical small urban community which is now suffering distinct, though moderate, economic disturbances and is fairly representative of communities in which 20 million people, or nearly 15 per cent of the population, live.—Carroll E. Palmer, M.D., Consultant in Child Hygiene, U. S. Public Health Service, *Pub. Health Rep.* 48, 12 (Oct. 20), 1933.

Proposed Federal Food and Drugs Act Its Public Health Features*

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IN order to appraise intelligently the health protective features of the legislation now before Congress, it is essential that they be compared with such features as are embodied in the present Federal Food and Drugs Act. Under this law, food is declared to be adulterated if it contain any added poisonous or deleterious substance which may render that article of food dangerous to health. The commerce in food which is deemed to be filthy, decomposed, or putrid, is also prohibited. The act further declares food to be adulterated if it is the product of a diseased animal or one that has died otherwise than by slaughter.

In the field of drugs and medicines, the health protection afforded may be said to be indirect rather than direct. The law requires that official Pharmacopœial and National Formulary preparations shall conform to those standards or be labeled to show wherein they differ. False and misleading statements as to the ingredients of drugs are prohibited, and therapeutic claims which are false and fraudulent make a violation. Cosmetics are subject to no regulation whatever at the present time so far as interstate commerce is concerned.

Turning now to the proposed new act, identified as S. 1944, and introduced by Senator Copeland last June, we find a number of very definite health measures not included in the present law. In the first place, all of the valuable provisions of the present law, whether from the health or economic viewpoint, have been retained. In the case of food, we find these supplemented, so far as public health is concerned, in the following particulars. Food is adulterated if it is or may be dangerous to health. Certain species of fish and some shellfish, such as mussels, are naturally poisonous, and a few varieties of beans, although generally foreign grown, contain dangerous amounts of a cyanogenetic glucoside. Such foods at the present time are not in violation of the act although obviously dangerous to health. The bill would give jurisdiction to the Department to regulate the type of containers used for food prohibiting such as might render the contents injurious to health.

As an example, we may cite the use of collapsible lead tubes for fish and cheese preparations, as well as the lead foil frequently used to wrap cheese, candies and similar articles. In the case of confectionery, resinous glazes and non-nutritive substances are definitely forbidden. The latter is of particular importance in view of the tendency on the part of certain manufacturers of novelty candies to incorporate metallic trinkets, marbles, coins, and similar articles to increase sales.

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Some of these are made of lead and contaminate the candy even when the article itself may have been removed. Hard substances concealed or partially concealed are, of course, likely to injure the teeth or become lodged in the respiratory tract of children. A recent court decision averred that the present act does not forbid the addition of such substances to candy.

The present act is silent with respect to the sanitary conditions of establishments where food is prepared or manufactured for interstate shipment. The new bill states that food which has been prepared, packed, or held, under insanitary conditions whereby it may have been contaminated with filth shall be deemed adulterated. These sanitary provisions are supplemented by a special paragraph relating to conditions of manufacturing, of processing, and of packing. While the authority of this section extends to drugs and cosmetics, it is perhaps particularly pertinent in the case of food. The substance of this provision is to the effect that where conditions surrounding manufacturing, processing, or packing are such that the product may be injurious to health and its injurious nature cannot adequately be determined by objective examination, the Secretary of Agriculture is authorized to require such manufacturers or packers to obtain a permit. Such permit may be obtained only on compliance with regulations which the Secretary is authorized to promulgate. The period during which permit or licensed operations shall be required is optional with the Secretary, who is also authorized to suspend immediately any permit where the conditions of its issuance have been violated. There are certain operations in the food field to which this permit system is peculiarly appropriate.

This Association is fully aware of the repeated instances of food poisoning which have been traced to infected cream fillings, either cream puffs, chocolate eclairs, or cream pies. In most cases, before the bacteriological evidence as to the causative agent has been obtained, the offending article of food has been distributed with probable increased incidence of food poisoning. A similar situation is reflected in the commercial preparation of fresh crabmeat, that is, fresh, cooked crabmeat, packed in containers which are not hermetically sealed and processed. Other varieties of shellfish may be subject to contamination either through polluted growing areas or as a result of insanitary preparation. The difficulty and delay incident to the confirmation of its dangerous character through objective examination is at once apparent. Where careless or indifferent methods are known to prevail in the handling of foods, such a permit system obviously constitutes a real public health safeguard.

It may also be of interest to mention the fact that the new bill provides for the use in foods of only such coal tar colors as have been certified by the Secretary of Agriculture. Especially noteworthy is the language of the section which provides for administrative findings of safe limits for such toxic substances as may unavoidably be present in food. The Secretary of Agriculture, after due notice and hearing, may either prohibit such substances or establish tolerances when he finds "that the presence of an added poisonous or added deleterious substance in or on food or cosmetics is or may be injurious to health, taking into account other ways in which the consumer or user may partake of or be exposed to the same or other poisonous or deleterious substances, . . ." In other words, the Secretary shall not only take into account the toxicity of the added substance, *per se*, but the probable effect of this ingredient after considering all of the other public health factors involved. The authority to establish

tolerances includes cosmetics as well as foods.

The adulteration of drugs is defined essentially as under the present act except in one very important particular. The terms of the bill declare a drug adulterated if it is or may be dangerous to health under the conditions of use prescribed by its label. There are certain drug preparations which are actually a menace to health when used without competent medical advice. At the present time such drugs may be sold if they are truthfully labeled and bear no false and fraudulent claims of therapeutic benefit. Not so long ago the death of a prominent and wealthy citizen of this country was widely heralded in the press as one due to the indiscriminate use of a radium salt preparation. The preparation was known to the Food and Drug Administration; was not improperly labeled; and its shipment in commerce was not a violation of the present law. Under the terms of the proposed bill it would be very definitely brought within the ban of the statute.

The misbranding of drugs is more specifically covered in the text of the proposed measure. Not only is the list of narcotic and hypnotic substances supplemented by the name with such products as the barbituric acid derivatives, paraldehyde, peyote, and sulphonmethane, but there is a further requirement that in addition to the name and proportion of such substances present the label shall bear the words "Warning —May be habit-forming." This section of the bill also authorizes the Secretary to supplement this list with such other substances as he may find to possess narcotic or hypnotic properties. If the labeling of a drug bears the name of any disease for which such drug is not a specific cure but only a palliative, it shall bear in immediate connection with the name and in equal prominence a statement that the drug is not a cure for the disease named. In the case of drugs which are liable to deteriorate, the Secretary is authorized to prescribe regulations for the packaging of such articles and for labeling to show such precautions as may be necessary for the protection of public health. A preparation which is represented as a germicide, bactericide, disinfectant, or antiseptic, must be plainly and conspicuously labeled to show exactly the method and extent of application necessary to kill active microörganisms with which the preparation comes in contact.

The question of individual susceptibility both to foods and drugs has not been overlooked in the text of this bill. Among the paragraphs relating to the misbranding of foods is one which requires that an article of food for which no definition of identity has been adopted shall bear upon its label the name of each ingredient in order of predominance by weight, exempting the specific designation of the particular spice, flavor, and artificial color. Such informative labeling is of course valuable for discriminative purchasing but most important to advise those sufferers from various types of food allergy as to the definite character of such foods as are now sold under fanciful or foreign names without disclosing the presence of substances which are responsible for the appearance of untoward symptoms in such cases. Parallel provisions are to be found in the drug misbranding section. Under this proviso any drug other than a U.S.P. or N.F. preparation is required to show on its label its common name, if such exists, as well as the presence and amount of each medicinal or physiologically active ingredient, and if necessary for the protection of public health, the Secretary may prescribe further regulations for labeling. Here again is an additional safeguard afforded those for whom certain drugs are definitely contra-indicated.

A discussion of drug regulations

would be incomplete without calling attention to the definition for drug. At the present time, the term "drug" means all medicines and preparations official in the United States Pharmacopœia or National Formulary, or any substance intended to be used for the cure, mitigation or prevention of disease. The new bill carries the same definition but supplements it in two important particulars: First, to include with substances all preparations and devices for the cure, mitigation, treatment or prevention of disease, and, second, all substances and preparations other than food and all devices as well which are intended to affect the structure of or any function of the body. Such devices as electric belts recommended for various ills and such preparations as are now offered and guaranteed safely to slenderize the human form are at the present time outside the jurisdiction of the act and their regulation is only another step to safeguard the public health.

Since the present food and drugs act is silent with respect to cosmetics, it may be of interest to note that it is proposed to define this term to include "all substances and preparations intended for cleansing, or altering the appearance of, or promoting the attractiveness of, the person." A cosmetic will be deemed to be adulterated in two instances: (1) if it is or may be injurious to the user either under the conditions of use prescribed in the labeling, or under customary or usual conditions of use, and (2) if it bears or contains any poisonous or deleterious ingredient which is prohibited or which is in excess of the limit which the Secretary is authorized to prescribe.

All foods, drugs, and cosmetics are included in the sections relating to false advertising. An advertisement of any of these commodities is false if it is untrue in any particular, or by ambiguity or inference creates a misleading impression, and the term "advertising" includes all representations of fact or opinion disseminated in any manner other than by labeling. All of the injunctions respecting the proper labeling of foods, drugs, and cosmetics apply with equal force to their advertisement. In addition the bill cites a list of diseases, including appendicitis, cancer, diabetes, nephritis, tuberculosis, and venereal diseases, where self-medication may be dangerous or contrary to the interests of public health, and for these the advertising of drugs is prohibited, except where such advertising is disseminated to members of the medical and pharmacological professions or appears in scientific periodicals. The public health significance of the control of advertising, particularly in the field of drugs, should be at once apparent. At the present time there is a long list of drugs which are shipped in interstate commerce, the labeling of which is not in violation of the present Federal Food and Drugs Act, but the same preparations are extravagantly advertised in the press or by radio with a complete disregard of the falsity of the claims made with respect to the therapeutic benefit promised sufferers of these various afflictions. The power and influence of advertising is readily conceded. When such advertising relates to the food which is necessary to maintain health and to the drugs which are expected to restore it, public welfare demands that the statements made in the public press and through the channels of the radio shall be free from misleading statements in the case of food, and false or fraudulent claims in the case of drugs.

Aside from the increased penalties which have been provided there are two more sections of interest. One relates to injunction proceedings which are provided in the case of repeated shipment in interstate commerce of adulterated foods, drugs, and cosmetics,

and for the continuous dissemination by broadcast or United States Mail of false advertising of these commodities. The other section relates to publicity, and authorizes the Secretary of Agriculture to disseminate from time to time any information he deems necessary in the interest of public health or for the prevention of fraud.

In this paper an attempt has been made merely to summarize the health protective features of this new legislation. The bill contains many other valuable provisions which are not to be found in the present act, all of which are in the interest of better consumer protection. The bill has been termed a consumer's measure; at any rate it has been framed with that idea in mind. It should be of especial interest to public health officials and the Department has conceived that it has an obligation to acquaint such officials and through them, so far as possible, the consuming public with the steps which have been taken in their interest.

The Department of Agriculture, through the Food and Drug Administration, will coöperate to the fullest extent in acquainting you, and through you others who may be interested, with this legislation. It expressly desires that you give the Administration the benefit of your opinion, criticism and comment on this measure and what it purports to accomplish.

Childbirth Benefits in the New Social Insurance Law, Rumania

THE law of April 8, 1933, consolidating and amending the social insurance laws of Rumania, contains much more generous childbirth-benefit provisions than the law of 1912 by which compulsory sickness insurance was first introduced in Rumania.

An insured woman is now entitled to a childbirth benefit of 50 per cent of her wages payable for 12 weeks, to treatment by a physician or midwife, and to the necessary medicines; whereas in the old law no medical treatment or medicines were provided in addition to the cash benefit, which was paid for only 6 weeks but could be extended for another 6 weeks if the woman nursed the child.

In addition to extending the duration of the childbirth benefit the new law provides a special benefit for a 6-week period if the woman nurses the child.

Instead of the cash benefit the woman may be given treatment in a maternity clinic. During her stay in the clinic the cash benefit is discontinued, unless she is supporting her family; in that case one-half of the benefit is paid.

The new law provides for the uninsured wife of an insured man the same childbirth benefits as for a woman insured in her own right, provided her husband has paid his dues for at least 52 weeks in the preceding 2 years. If the financial condition of the insurance fund permits, the uninsured wife may be given in addition a cash benefit of 50 per cent of the sick benefit to which her husband would be entitled in case of illness.—*Monitorul Oficial,* Budapest, April 8, 1933; *Bulletin de l'Office International du Travail,* Basel, 1913.

The Roentgenogram in So-Called "Acute" Silicosis*

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THE recent literature contains several references to an acute form of silicosis. In dealing with a disease which is by definition chronic in its course, the designation "acute" is ambiguous, but it has been employed to indicate that the process develops within a period of a few months or years. It has been my privilege to examine a series of roentgenograms of persons said to be suffering from this condition. One set was from a small group of sand blasters and another from a group of colored laborers who had been engaged in the boring of a tunnel through rock of a very high silica content. Some of these persons have died and were autopsied. The pathological aspects will be illustrated by Dr. Gardner, while I will attempt to describe the roentgenograms in the living members of the group.

Before considering the roentgenological appearances of this disease, it is of prime importance to consider the roentgenologic technic. In an acute silicosis we would presumably be dealing with deposit in the lymphatics and regional lymph nodes of particulate matter which is capable of provoking an acute reaction in these tissues. We have reason to assume that in the early phase of the disease the physical changes in the lungs would be so slight that they would not produce recognizable shadows. To demonstrate such minute changes it is necessary to give especial attention to the factors involved in the making of the roentgenograms. I do not hesitate to say that stereoroentgenograms are necessary if we are interested in the early manifestations. With properly taken films, one can, in the interpretation, eliminate disturbing extrapulmonary shadows and also evaluate slight intrapulmonary variations due to movement. The X-ray tube should be of the line-focus copper-backed-target type, with a focal spot not greater than 10/64", the tube-film distance not less than 4′ and the time of exposure (which should be carefully checked) not slower than 1/10 sec., or preferably 1/20 sec. Longer exposures permit of too much movement of the intrapulmonary shadows. Obviously there are many other factors which, if neglected, will make interpretation more difficult. These are too numerous to mention. Probably the most important is the blur due to screen-film contact and movement. All of these factors are specifically mentioned because of the fact that a larger focal spot, a longer exposure time, and a shorter distance, may produce variations in the shadows that can be very misleading.

In considering the very slight alteration in the pulmonary field which such insignificant anatomical changes produce, one must bear in mind certain manifestations of the normal chest: The movement of the pulmonary markings at the left base due to the heart beat may well be mistaken for the

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cloudiness expected in early silicosis. Similarly the shadow of the margin of the pectoralis muscle is not unlike that shadow seen in cases of beginning fibrosis. However, the shadow of the muscle is situated more peripherally and continues beyond the pulmonary field while the intrapulmonary haziness of silicosis is usually more centrally located. Also, in the case of the pectoralis muscle the lung markings are visible through the shadow of the muscle, whereas the enveloping intrapulmonary infiltration produces cloudiness which tends to obscure the vascular ramifications. In general, if the cloudiness, which has not yet assumed the nodular appearance, is confined to the region of the pectoralis muscle or to the left base, and if no alteration of the pulmonary pattern is seen above this level, we may not be justified in believing we are dealing with a pathological process.

Of a large series of roentgenograms of miners who have been exposed to silica for varying periods of time, in general, the shadow changes in the roentgenogram increase with the length of exposure. Roentgenograms of a certain quality or character, that is, those in which there was loss of detail due to movement, or large focal spot, or short tube-film distance, or a too contrasty film, or a combination of these, may have such a shadow complex as to be mistaken for such pathological changes that take place before obvious nodulation has appeared.

After the stage of nodulation has been reached it is not difficult to recognize the characteristic mottling. If we are to be guided by experience in other acute pulmonary diseases, that is, pneumonia or pulmonary tuberculosis, we have reason to believe that in " acute " silicosis, serial roentgenograms taken at short intervals will or should show obvious changes in the shadows during the period of progression. Monthly roentgenograms should reveal a rapid increase of shadows until the climax is reached, when the process should pass into the chronic stage, which form is now well recognized.

I think it might be postulated that if serial roentgenograms fail to reveal obvious, rapidly changing shadows, and by that is meant shadows changing from month to month or week to week, one is not justified from a roentgenological point of view, in considering a silicotic process as acute. Undoubtedly there are persons exposed to heavy concentrations of silica for short periods who exhibit various symptoms of acute disease, but the serial roentgenograms which I have seen did not confirm the diagnosis of uncomplicated silicosis.

At this juncture it is highly important to consider from a roentgenographic standpoint the presence of an infectious process superimposed upon a preëxisting silicosis, or *vice versa*. Here we have (according to the experimental work of Gardner) reason to expect reasonably rapid changes to take place in the processes. If the picture changes with extreme rapidity it is hard to conceive that these alterations are due only to the inhaled silica; it is more probable that one is dealing with a complicating infection.

In general, two types of this so-called infection picture were present in the roentgenograms studied: (1) that which resembled very closely the characteristic shadows of a pulmonary tuberculosis—in some instances even to the extent of having cavity formation and in which there was no diffuse nodulation; and (2) those which presented the above characteristic shadow-complex of a tuberculosis plus a diffuse nodulation. To this latter group might be added another type. A diffuse nodulation of a distinctly fluffy character—diffuse cotton ball appearance, unlike the longstanding nodulations of the non-infective group. The inferred infective process, in a few instances, was so advanced as

to make the interpretation of an associated silicosis uncertain. In not a few of those cases who probably had an infection it was not improbable that some had a degree of silicosis that was not yet recognizable by roentgen examination.

There is reason to expect, in any acute process, shadows of a rather characteristic nature. In practically all cases the one outstanding feature of the roentgen shadow complex is its cottony or fluffy appearance and its ill-defined margins. It is not to be forgotten that in the earliest phase of such processes, there may be no discernible shadow in the lung field. The cellular reaction may be sufficient to produce pronounced subjective symptoms, but for the time being there is not sufficient loss of air space to be recognizable on the roentgenogram. If the disease progresses this condition does not last long and the next roentgenogram of the series will show a change. I believe until serial roentgenograms reveal rapidly progressive or retrogressive shadows, and also the stigma of an infection be satisfactorily excluded, one is not justified in interpreting the roentgenogram as rapid uncomplicated silicosis.

Gardner writes "In most instances authors claim that fibrosis of the lungs develops after a few short inhalations of dust over a period of weeks or months." Further he states that "in order to produce significant changes, animals must be exposed for periods measurable in years to concentrations of dust no heavier than those in the worst industrial condition."

In the rabbit it has been demonstrated that silicosis is a progressive disease. After 13 months of exposure the animals were set aside in a normal atmosphere. The resulting progressive changes that occurred were the development of proliferative nodules. No mention is made of acute silicosis.

Rabbits exposed to a high concentration of quartz dust for 13 months revealed at autopsy only many small proliferative nodules in and about the pulmonary lymphoid tissues. The X-rays revealed barely detectable shadows.[1]

There is one pertinent point, however, that needs to be cleared up before one can exclude the possibility of acute silicosis, and that is, in many cases apparently suffering from silico-tuberculosis or tuberculo-silicosis, tubercle bacilli are not demonstrated.

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Pathology of So-Called Acute Silicosis*

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DURING the past 3 years several reports of so-called "acute silicosis" have appeared in the literature. As far as can be learned Macdonald, Piggot, and Gilder [1] first used the term in a publication describing silicosis in young women employed for 4¼ years or less in packing soap powder. Gerlach and Gander [2] reported a similar condition in a German scouring powder plant and Chapman [3] described its occurrence in an American factory of the same kind. These cases all developed in young women who were said to have been exposed to excessive concentrations of silica dust although no counts of the atmospheric concentrations had been made.

However, the authors were more impressed by the fact that there was free alkali dust in the air of the working places (approximately 25 per cent of such powders are alkalies) than with the high silica concentrations. They concluded that since silica is soluble in an alkaline medium the inhaled material would quickly dissolve to form colloidal silica in the moist lung tissues, and as a result the connective tissues would respond by proliferation much more rapidly than is said to be the case when pure silica is slowly dissolved by the slightly alkaline body fluids.

Kessler [4] reported on a group of sand pulverizers who were alleged to have developed silicosis after exposures as short as 4 months to 1½ years. These were young male negroes. It was stated that the dust concentrations were excessive although the actual figures are not available. The particles were very fine (1 to 5 microns in diameter) and over 99 per cent of them were free crystalline silica. In this group it was assumed that the rapid development of the silicotic process was due solely to the high concentration of dust in the atmosphere. Since the men had not been examined before employment in this plant, they might have had previous exposures to siliceous dust. If so, the silicosis from which they apparently suffered could not be considered acute.

The lack of complete data in these reports raises the question as to whether a chronic disease like silicosis, which in the majority of industries today requires at least 10 or 12 years for its development, and which under the very worst conditions in the past only became recognizable after 3 or 4 years, can under any conditions actually develop to a degree where it can be recognized in a roentgenogram in shorter periods of time. If it does occur, what is its character and what are the conditions responsible for the accelerated reaction? Two factors, the presence of free alkali in association with silica dust, and an excessive concentration of the silica itself, have already been suggested. A

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third factor might be particle size, and a fourth, concomitant infection.

The author has had opportunity to study the lung tissues and in most instances ante-mortem roentgenograms from 15 persons who were said to have developed silicosis after dust exposures of from 8 to 17 months. Of these 9 were employed as laborers and drillers in a tunnel through practically pure quartz; 4 were sand blasters, and 3 were sand pulverizers from the same group reported by Kessler.[4] For the last group the occupational histories are most incomplete and probably inaccurate.

No atmospheric dust counts were available, but from all reports excessive amounts of extremely fine dust were generated in each case. In the tunnel, which was bored without effective ventilation, the men returned to the face immediately after blasting and were required to work with dry drills in an atmosphere so exhausted by gasoline engines that they must have breathed abnormally fast. Such conditions would obviously favor the inhalation of unusually large quantities of very fine dust. The sand blasters also were without effective protection; one man dated the onset of his symptoms from the bursting of a sand hose while cleaning the inside of a large tank. The sand was used over and over until it became so fine as to be no longer effective as an abrasive. In the pulverizing plant, where the sand used by the sand blasters was ground and bagged, there were protective devices but these were apparently not altogether effective. While this information implies excessive concentrations of extremely fine silica particles, the dust exposures cannot be measured quantitatively.

In none of the groups had there been any attempt to examine the men when they were employed. Therefore one is compelled to rely upon the occupational history obtained in all cases after the development of alleged symptoms. Such information must be regarded with suspicion when claims for compensation are pending, as was the case with these individuals. Some of the information was obviously valueless, as in the case of a sand pulverizer with a roentgenogram showing widespread pulmonary disease, who had worked in the plant only 35 days. On the other hand, the age of many in these groups and the conditions under which they were hired precluded any prolonged exposure to silica in previous occupations. Five of the tunnel workmen were under 29; the others, with 1 exception, were under 40. Seven were negroes who claimed to have had no previous experience in mines. Two were white men who had been coal miners for 4 and 7 years respectively. The negroes were reported to be common laborers brought from another state under contract. Most of them were employed at times as drillers, an unusual occupation for unskilled laborers, but it was contended that professional miners would not work under the conditions existing in this undertaking. The sand pulverizers were also young negroes whose previous employment was unknown. The sand blasters were all white, aged 26, 27, and 45 respectively. This evidence for the shortness of the exposure periods is also obviously open to criticism, but even if the exposure was not so brief as claimed in some individual cases, nevertheless it could not have been as long as that in industries usually associated with a silicosis hazard.

Since information as to the exact character and duration of the dust exposure in these cases is so limited, the justification for this presentation might be questioned. Several reasons exist. In the litigation attendant upon the presentation of compensation claims many of these persons were alleged to be suffering from an "acute silicosis." With 3 exceptions these men died from

9 to 18 months after completing very short exposures to pure silica. Few autopsies have been reported upon persons dying during the course of such short, severe exposures and therefore these cases may shed some light upon the nature and extent of the silicotic reaction. While it is known that silicosis is a progressive disease, the amount of progression to be expected within so short a time after the exposures must be limited.

in many of the sections they are extremely numerous. The relative size of the nodules which had developed after various exposures could be more accurately measured. In a group of sand blasters working from 1 to 5 years the outline of the central hyaline portions of various nodules in micro-sections were drawn with a camera lucida. Figure I illustrates representative nodules from 4 different cases. After a 12 months' exposure the nodules measured from 0.3

TABLE I

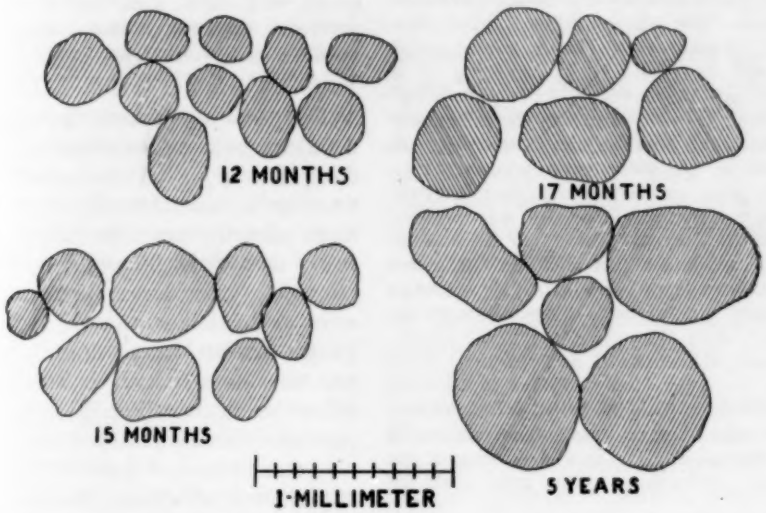
Case No.	Age Color	Occupation	Exposure	Interval to Death	Silicosis	%SiO_2 Dry Lung	Infection	Organisms
63	W 23	Driller	Coal 7 yr. Tunnel 13 mo.	9 mo.	4+ (Anthracosis)	1.98	? TB	O
64	W 46	Laborer	Coal 4 yr. Tunnel 8 mo.	18 "	4+ (Anthracosis)	3.10	Acute and Chr. Non-TB. Pn.	Diplococci
65	C 29	Driller	Tunnel 9 "	15 "	4+	2.78	Caseous Pn.	TBC
66	C 24	Laborer	" 9–10 "	12 "	±	0.875	Caseous Pn.	TBC
67	C 21	"	" 9 "	14 "	+	1.975	TB. Br-Pn.	TBC
68	C 34	"	" 13 "	?	4+	2.77	TB. Br-Pn.	TBC
69	C 29	"	" 13 "	11 "	0	0.84	TB. with Cavity	O
70	C 38	"	" 13 "	13 "	2+	2.58	Cas. Pn. Cavity	O
71	C 37	"	" 13 "	13 "	4+	1.24	? TB	O
34	W 45	Sand blaster	Shop 17 "	21 "	5+	–	Unresolved Pn.	O
36	W 27	"	" 12 "	20 "	4+	–	TB. Pn. Cavity	TBC
47	W 26	"	" 15 "	15 "	3+	–	TB. Pn.	TBC
44	C 28	Sand Pulverizer	35 days?	?	3+	1.81	Caseous Pn.	–
45	?	"	?	?	3+	2.1	Aspiration TB	–
46	C 29	"	3 yrs?	?	3+	2.45	TB. Pn.	–

In all cases but 1 (No. 69) there is definite microscopic evidence of silicosis consisting of characteristic hyaline fibrous nodules. These lesions are definitely smaller but appreciably more abundant than those encountered in the usual run of silicosis cases known to have had more prolonged exposures to dust. It has not been possible to count the actual number of nodules in a given volume of lung tissue, as suitable quantities from corresponding parts of the different lungs were not available; but

to 0.4 mm. in diameter; by 5 years they had attained a diameter of 0.7 to 0.8 mm. In the intervening periods of 15 and 18 months there had been an appreciable increase in size. The nodules in the tunnel workers were approximately 0.4 mm. in diameter. For comparison a few nodules from the lung of a hard rock lead miner were projected in a similar manner. These nodules, too large for illustration, measured from 3 to 4 mm. in diameter. The tracings also demonstrated that all

FIGURE I

Camera Lucida tracings of silicotic nodules at various intervals of exposure. The nodules from the ordinary case of silicosis are larger than the entire area of this figure.



the nodules encountered in any lung are quite uniform in size and that small, apparently fresh nodules are relatively rare after prolonged exposures.

In the cases under discussion the nodules are massed in a compact zone, a centimeter or more in width, beneath the pleura. Along many of the interlobular septa there are wide bands of closely packed nodules which encroach upon the parenchyma on either side. In such formations the lesions are surrounded and embedded in sheets of loose cellular or hyaline connective tissue containing appreciable quantities of fine black dust particles. A few nodules also occur singly or in small clusters throughout the alveolar tissue. When stained by Foot's method for reticulum, the impression is gained that the reaction is relatively young, for black staining reticulum predominates over red stained collagenous elements. In many air spaces are masses of necrotic exudate which may be produced by the action of silica. The polarizing microscope reveals excessive amounts of exceedingly fine, doubly refractile particles with relatively few of the large acicular and needle-like fragments which are so common in the ordinary silicotic lesions. In the case of the 2 white tunnel workers who admitted having had 4 to 7 years previous employment in coal mines, the silicotic nodules are 4 or 5 times as large and frequently occur as aggregations surrounded by a capsule of cellular connective tissue.

In all cases the interalveolar septa are generally thickened. In the presence of chronic infection it is impossible to estimate how much of this change is due to the silica, but when the infection is acute and exudative it probably has little effect upon the pulmonary framework. The bronchial lymph nodes were available for examination in 13 of the cases, and among these only 61 per cent showed definite silicotic nodules. In each instance at least 3 different nodes were examined.

In all of the cases death was due to pulmonary infection; in 11 this was definitely tuberculous; in 2 there was an acute and chronic non-tuberculous pneumonia, and in the other 3, tuber-

culosis was probably the cause although this could not be definitely proved.

The most common lesion was a diffuse caseous pneumonia without definite tubercle formation. The air spaces were filled with necrotic exudate which in occasional areas could still be identified as consisting of a mixture of mononuclear and polynuclear leucocytes. In many instances the pulmonary framework and even the silicotic nodules were involved in the necrotizing process. Frequently great numbers of cholesterol crystal clefts were observed. (The cleft was formerly occupied by a crystal which was dissolved in the preparation of the section.) In 5 instances the tuberculosis occurred in small broncho-pneumonic patches with caseation scattered here and there throughout the lung. Cavity formation was observed in 2 of these cases but in the other 3 only sections of the lung were obtained without record of conditions in the remaining portions. Tubercle bacilli were rare in all instances, and in some of the obviously tuberculous lesions none could be found.

There were 2 cases (Nos. 63, 71) in which the infectious process was presumably tuberculous but a definite diagnosis could not be made. The air spaces were filled with a partially necrotic exudate and some of the silicotic nodules had a central zone of granular necrosis but neither bacilli nor typical tuberculous lesions could be discovered.

The acute and chronic non-tuberculous pneumonias were interesting. One case (No. 64) occurred in a white man with 3 or 4 years' experience in a coal mine who showed extensive silicosis of the small nodule type and considerable anthracosis. In one lung the air spaces between the silicotic nodules were overdistended with an exudate consisting almost entirely of polynuclear leucocytes with numerous pneumococcus-like organisms; in the other there was organization with extensive interstitial fibrosis and an acute exudate in the distorted air spaces. The other case (No. 34), a more acute unresolved pneumonia also occurred in a white man, a sand blaster for 17 months. His symptoms appeared at the end of this period but he worked at another job in the same plant for 17 months more before he was forced to enter a hospital. He died 4 months later. The roentgenological and pathological diagnosis at this institution was silicosis complicated by tuberculous broncho-pneumonia and right heart failure. At first sight the sections did suggest an element of tuberculosis but further study has convinced the writer that the infection was not of this character. Silicotic nodules were embedded in areas of massive fibrosis from which most of the air spaces had disappeared or were represented by distorted slits. Other less involved portions of the lung showed air spaces with thick walls and a mixture of acute and organizing fibrinous exudate in their lumina. In still other areas edema and passive congestion dominated the picture.

The gross appearances have not been described because they were uninformative. In only 8 of the tunnel workers was the author able to see the whole lungs and in them the tissue had already been fixed in formalin; from the remaining ones large blocks of tissue were available for study. In 7 of the group caseous tuberculous pneumonia was so extensive that it obscured any other lesion which might have been present. Careful search with a lens disclosed nodules not greater than 1 mm. in diameter which suggested a complicating early silicotic reaction in 2 instances. In 2 others the diagnosis was questionable. Had the occupational histories not been known, it is doubtful whether silicosis would have been thought of in any of them. Careful inspection of the apices of the lungs failed to disclose evidence of healed tuberculous lesions, and no calcified foci could be detected in the lymph nodes.

Dr. Clayton S. Smith [5] has analyzed portions of the lungs of the tunnel workers for silica. The complete details of his study are published elsewhere in this *Journal*, but he has permitted the author to summarize his findings in this report. He made separate analyses of various portions of each lung but in Table I his figures for each case have been averaged. The percentage of silica in the dried lung varied between 0.84 and 3.1. It was lowest in the case with no silicotic nodules (No. 69). A second case with very slight lesions (No. 66), showed only 0.875 per cent. In the others, with variable amounts of reaction, it ranged between 1.24 and 3.1, but the amount was not proportional to the period of

employment. The highest figure occurred in a man with 3 or 4 years' previous employment in a coal mine, but the other coal miner who worked 7 years at the same occupation showed less silica than most of the men exposed only in the tunnel. For the sand pulverizers Dr. Louis Gershenfeld furnished reports of analyses which showed from 1.8 to 2.5 per cent of silica in the dry lung tissue. The duration of employment reported for this group seems most untrustworthy.

DISCUSSION

It is indisputable that this group of workmen exposed in three different occupations to high concentrations of silica dust had developed the histological lesions of silicosis by the time of their death. Whether their exposures were actually as short as 8 to 17 months cannot be established with certainty, but their age would preclude any occupation of many years duration. Dr. Smith's analysis of the lung tissues of the tunnel men showed 1.24 to 3.1 per cent of silica in the dry weight of the lungs with histological lesions of silicosis. In the one man with no specific changes his figure was 0.84 per cent. For the sand blasters the corresponding figures varied from 1.81 to 2.45 per cent. These are as high as McCrae's [6] percentages for ordinary silicosis in South African gold mines. He does not state the duration of exposures in his report but the per cent of silica in 6 dried lungs varied from 1.39 to 4.47 with an average of 2.63. The precise amount of reaction which had developed at the end of the period of employment is unknown as no case came to autopsy at that time. All observations were made from 9 to 20 months later when the men had died of infection. Within this period some change in the lesions would be expected particularly in the presence of infection. The significant feature is that the gross anatomical changes which had developed at the time of death were not sufficiently extensive or characteristic to be recognized as silicotic in origin.

Strictly speaking, the first question proposed in this investigation has been answered in the affirmative; silicosis can develop under these conditions of exposure but the reaction is of microscopic proportions. Since the men could not have been employed for very long periods because of their ages, and since chemical analysis showed that their lungs contained excessive amounts of silica, it must be assumed that this material accumulated within a comparatively short time.

The second question was whether the silicosis developing under such conditions in any way differed from the usual picture observed in miners, quarrymen, founders, etc. Direct comparison is impossible for lack of pathological material on men dying after short periods of employment in these industries. It is quite possible that the early lesions of the more familiar type of the disease are comparable both in rate of development and character to those described for this series of cases which had been called "acute." In the absence of any other basis of comparison for the rate of development of silicotic nodules, reference is made to animal experiments.[7] In guinea pigs exposed for from 1 to 2 years to concentrations of approximately 200 million pure crystalline silica particles per cubic foot of air, the number of nodules per unit area was much smaller than that in the human cases under discussion. After 1 year's exposure both were approximately of the same size but the human lesions were completely hyalinized, whereas in the animals this change was only beginning to appear. During the ensuing year the total area of the experimental nodule attained approximately the same size as the central hyaline zone in the nodule of the sand blasters and tunnel

men exposed for similar periods. Whether the difference is a reflection of variation in the reaction to silica in the two species or whether it signifies that the exposures in the human cases were greatly in excess of the 200 million particles per cubic foot of air cannot be ascertained.

The character of the silicotic lesions encountered in these cases differs in three particulars from those usually observed:

1. The individual nodules are small but they are massed in zones of considerable width along the course of the deep and superficial pulmonary lymphatic trunks and they are embedded in wide bands of connective tissue which in many places has itself become hyalinized. In the ordinary case the nodules are much larger, sometimes developing from a single center and sometimes resulting from the fusion of adjacent foci; but they tend to remain discrete and in the absence of concurrent infection they are not matted together in a mass of fibrous tissue.

2. The lymph nodes which drain the lung are ordinarily severely affected before the pulmonary changes have progressed very far, but in about one-third of the cases under discussion there was no evidence of silicosis in this location; and in others the involvement was relatively slight. It is possible that this may have been due to faulty selection of material, but it seems rather unlikely, for in most instances several nodes were sectioned.

3. All of the lungs showed an appreciable generalized thickening of the alveolar walls. Some of this reaction was undoubtedly due to the superimposed infection, but in the acute caseous pneumonias such proliferative changes are absent or not at all prominent.

The objection will immediately be raised that the unusual features of the silicosis which have been described are only unusual because of the coexistent infection. However, it should be remembered that the caseous pneumonias, at least, were very acute processes, probably non-existent during the period when these men were at work and the primary reactions to the dust were taking place. The group was composed of young adults, negroes in most cases, with probably little or no immunity to tubercle bacillus, so that their infections ran an acute course with a fatal termination in 15 months or less. If they had become infected while their silicosis was in its formative stages they would not have been able to continue so strenuous an employment and many would have died months earlier. It is tempting to speculate that because their microscopic silicotic lesions impaired the efficiency of their pulmonary lymphatics, these non-immune individuals were rendered even more susceptible to the action of the tubercle bacillus. In the non-immune individual with recognizable *advanced* silicosis a primary infection with the tubercle bacillus will sometimes cause death in 3 or 4 months. Whether this is also true of the type of silicosis under discussion remains to be demonstrated.

For these reasons it is believed that the localization of the silicotic nodules in this group of cases was not materially influenced by the terminal tuberculosis. Possibly their rate of development was accelerated by the presence of the infection. If it is granted that the dust concentrations to which the men were exposed were unusually high, this might well be the cause for the peculiarities described. It is known that if dust is inhaled for a long time in concentrations only moderately in excess of the physiological limits, the first manifestations of its presence will be reaction in the lymphatic system, both in the mediastinal lymph nodes and in the lungs. Such is the sequence in ordi-

nary silicosis. On the other hand, if the concentrations are so excessive that lymphatic system is entirely inadequate to eliminate the major portion of the foreign material, reaction would be expected to take place within all portions of the lung. The unusual picture of widespread thickening of the alveolar walls and of broad bands of cellular or hyaline connective tissue studded with nodules along the superficial lymphatics of the pleura and the deep lymphatics in the septa, bronchi, and blood vessels has been interpreted as reaction to excessive quantities of dust.

To what extent the factor of fineness of the dust particles contributed there is little adequate information. The sections, when examined in polarized light, exhibit exceedingly large numbers of very minute particles with comparatively few large ones. Time has been lacking to make a size distribution study of the particles from digested portions of these lungs. Experiments [8] have demonstrated that in rabbits the rate of the silicotic reaction varies directly with the size of the particles.

Finally, it should be mentioned that the diagnosis of tuberculosis superimposed upon silicosis of this character has often been most difficult. Other pathologists reviewing the same material have in some instances failed to agree. The lesions characteristic of the chronic forms of tuberculosis are often few in number. The necrosis produced by silica in non-tuberculous exudates often simulates caseation which has necessitated the examination of many sections before definite tuberculous lesions could be detected. Tubercle bacilli were only discovered after prolonged search in 50 per cent of the lesions examined. It is unfortunate that guinea pig inoculations could not have been made. If errors have been made it is felt that they occurred in classifying the non-tuberculous pneumonias as such rather than the reverse.

The roentgenographic appearances of the tunnel men have been discussed by H. L. Sampson.[9] He and the author had opportunity to examine a large number of films from other members of this group, but those of the particular men who died and were autopsied have not yet become available. In the group as a whole roentgenographic evidence of silicosis was very slight or absent; only changes due to infection could be readily recognized.

In view of the fact that microscopic examination revealed so many silicotic lesions, it is perhaps surprising that the X-ray failed to detect them. Analogous situation has been encountered in the roentgenological study of experimental silicosis in rabbits. After 13 months' exposure to rather heavy concentrations of crystalline silica, the X-ray reveals no definite change in the lung of the living animal, and yet if it is killed the lungs show a most extensive nodular silicosis. After 2 years' exposure, however, the amount of disease increases sufficiently to permit the visualization of nodular shadows. The same conditions obtain with respect to miliary tuberculosis in human beings. The lungs may show no evidence of a disseminated process in one examination, but if serial films are taken the time soon comes when tubercles can be visualized throughout the lungs.

SUMMARY

A histological study of 15 cases of so-called " acute " silicosis has been reported. This was based upon examination of the lung tissues of 9 tunnel workers exposed for 9 to 13 months, 3 sand blasters for 12 to 17 months, and 3 sand pulverizers on whom satisfactory histories of exposure were not obtained. Chemical analysis demonstrated that their lungs contained as much silica as those of South African gold miners employed for long periods. Their alleged occupational exposures did

PLATE I

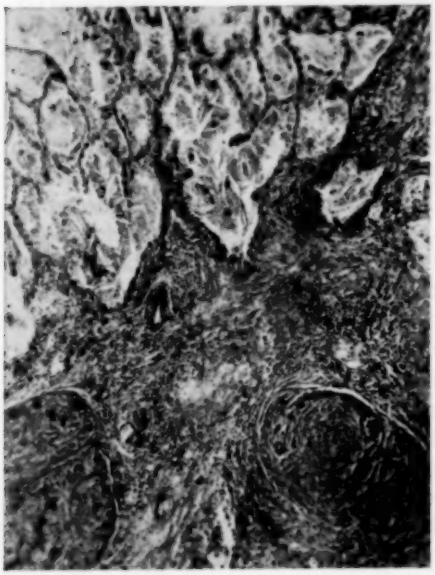


FIGURE 1.—14 months exposure in tunnel; died 13 months later. Silicotic nodules surrounded by cellular connective tissue. Exudate in air spaces.

FIGURE 2.—7 years in coal dust, 13 months in tunnel; died 9 months later. Silicotic nodules larger than those in Figure 3; marked interstitial fibrosis; pneumonic reaction in lower fourth of section, probably tuberculous.

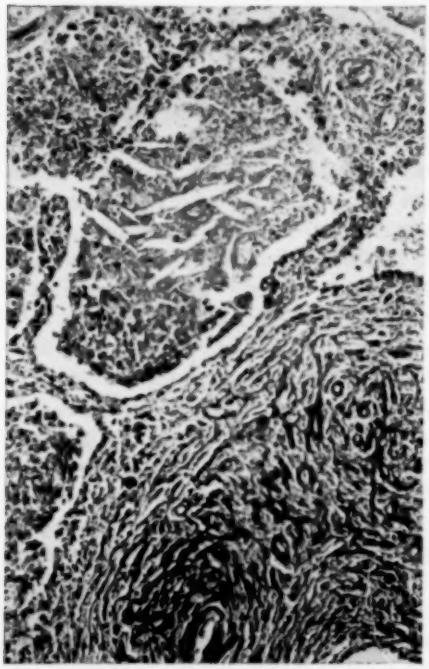


FIGURE 3.—12 months in tunnel; died within a year of acute tuberculous pneumonia. Section through area without obvious tuberculosis. Note clusters of very fine nodules along vessels through the center of the field.

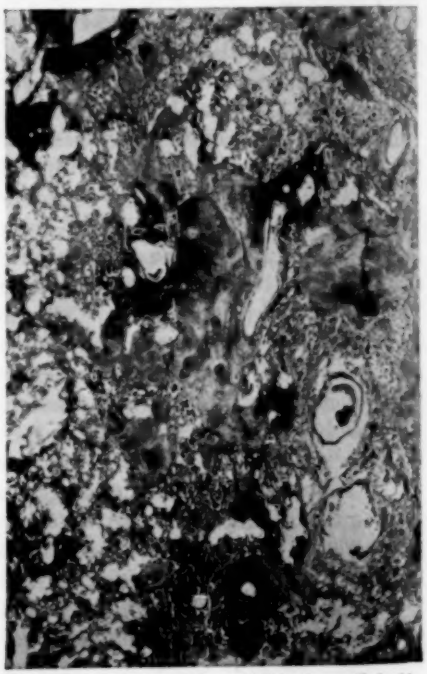


FIGURE 4.—11 months sand blasting; died 22 months later of acute tuberculous pneumonia. Silicotic nodule in right lower corner. Thickened alveolar wall and perivascular cellular fibrosis in right upper field. Necrotic exudate and cholesterol clefts within air spaces.

not exceed 17 months, a contention which is supported by the early age of the group as a whole. These men died of infection 9 to 21 months after ceasing work. In 11 of them the infection was considered to be definitely tuberculous, and in 2 others it was probably so. The other 2 had unresolved pneumonias. All but 1 of them, a tunnel man for 13 months, presented microscopic lesions characteristic of silicosis, but in no case was the disease sufficiently far advanced to be diagnosed on gross examination of the fixed tissues. The character and distribution of the changes did not resemble that usually seen in silicosis among miners and others who have died after prolonged exposures. This silicosis was characterized: (1) by masses of small nodules embedded in broad sheets of fibrous tissue surrounding the pulmonary lymphatics instead of isolated conglomerate nodules along the trunks and in the pulmonary parenchyma; (2) by a generalized fibrous thickening of the alveolar walls which is generally considered to be a late manifestation; and (3) by the absence or only slight involvement of the mediastinal lymph nodes which are usually replaced by fibrosis before extensive changes appear in the lung. These differences were interpreted as due to the inhalation of such excessive amounts of fine dust that little of it could be eliminated by the lymphatics. In most cases the tuberculous complication was so acute that it probably developed after the reaction to the dust was well established, and thus failed to influence the picture greatly.

The acuteness of the infection was explained by the fact that the majority of the men were young negroes with presumably little immunity to tuberculosis. Although there is histological evidence of silicosis, atypical in character, it seems doubtful whether there is justification for describing the process as "acute." At least this should only be done after serial roentgenograms together with post-mortem examinations have demonstrated the outcome of the allegedly heavy exposures to silica. The difficulty in properly evaluating the element of infection in the tissues suggests the need for caution in the interpretation of roentgenograms.

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Acknowledgment is due to the various persons who have so painstakingly secured data and pathological material for this study. They cannot be named at this time as in some instances litigation is still pending.

The Silica Content of the Lungs of a Group of Tunnel Workers*

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THE presence of silica in the lungs of an individual at post-mortem suggests the possibility of the disease silicosis during life. The diagnosis of silicosis is based on data secured from three principal sources: the history, particularly the occupational history, the physical examination, and the roentgenological examination of the lungs. Silicosis has been recognized at least until recently as existing in three different stages. The "stages" are given different names by British and American workers but are essentially the same in their clinical manifestations. In the British Dominions these stages are defined by law, but in America this is not true. Not only may silicosis exist in any one of three stages but it may be, and frequently is, complicated by other respiratory diseases, particularly tuberculosis. This complicates the differential diagnosis.

Investigations covering the etiology,[1] clinical manifestations[2] and roentgenologic aspect[3] of silicosis have so recently been made that it is only necessary to refer to the published reports where each of these phases is covered in detail.

The chemical examination of the lungs of persons dying of respiratory diseases offers definite aid in the final diagnosis of the disease. Unfortunately this means cannot be used until the patient has succumbed, but, nevertheless, the data secured may be of considerable value in confirming previous findings in the adjustment of industrial compensation claims.

When the total number of deaths from respiratory diseases is considered, the number of reported chemical analyses of the lungs of such individuals is very meager. It is, therefore, important that the chemical analyses of any group of lungs, no matter how small, be reported promptly in order that all interested in the general subject of pneumoconiosis may profit by the added information.

Quite recently two papers on the chemical analyses of lungs have appeared, one[4] in this country and one[5] in England. Since one appeared in July and the other in August, 1933, it will not be necessary to review the literature on the chemical analyses of lungs at this time (October, 1933). A comprehensive review may be obtained from Dr. McNally's paper.

Silicon is a widely distributed element and exists in nature chiefly in the form of the oxide, SiO_2, and as silicates of various kinds. Some authorities make a differentiation between silicosis and silicatosis, the one being caused by SiO_2 and the other by silicates. This distinction can only be made with assurance when it is known that the in-

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

haled dust consists principally of silicates and not SiO_2. Our present methods of chemical analysis of the lungs do not permit of a very accurate separation of free and combined silica. For this reason the silica found in lungs is reported as total SiO_2 which includes both the free and combined forms. Silicosis apparently may be produced by either SiO_2 or silicates when inhaled in the form of dust. Kaolin may be an exception to this statement.[6] Kaolin when injected into the subcutaneous tissues produces necrotic lesions similar to amorphous silica but in industrial medicine kaolin is not generally recognized as a cause of pneumoconiosis. In dust inhalation experiments on guinea pigs it has been shown by H. M. Carleton [7] and F. Haynes [8] that kaolin is at least a potentially dangerous dust. Not only must the dust contain silica or silicates but the dust must be very finely divided in order that the silica may become fixed in the lung. McCrea [9] reports that approximately 70 per cent of the particles recovered by him from post-mortem lung tissue had a diameter of less than $\frac{1}{8}$ that of a red blood cell.

How silica produces the characteristic changes in the lungs is not clearly understood. The original theory was that because of its hardness, sharpness, and relative insolubility, the silica dust caused direct injury to the lung tissue but this theory has in the main been discarded, principally for two reasons. Recent investigations have shown that the dust particles in order to be absorbed into the lung tissue must be much too small to produce any direct mechanical injury. Furthermore it has been shown that silica is not the totally insoluble substance it was once believed to be.

The modern viewpoint is that the changes brought about in the lung by silica are due to its chemical action. It is only fair to state that it is not known whether in the lung the silica acts as a protoplasmic poison or whether its action is due solely to its colloidal properties.[10]

The material for the present investigation was obtained through the courtesy of Dr. L. R. Harless of Gauley Bridge, W. Va. Previous to the time that the material was made available for us, sections of the lungs had been removed for other purposes so that it was impossible for us to obtain the weight of the entire lungs. The lungs had been preserved for varying periods of time in formalin solution. In no case was a metal-containing preservative used, so that the ash reported represents the true ash content of the lung without any added salts. In some of the specimens it was possible to select portions which on gross examination appeared to be normal. These are designated in our report as " normal," but it does not mean that the portions taken were histologically normal. However, our results show that in the same individual the area that was apparently normal actually did contain less silica than other portions of the same lung. In one or two instances we were able to secure portions of the right and left lung of the same individual.

The material for analysis consisted of 10–15-gram sections taken from various parts of the lung in order to obtain a representative sample. Care was taken to exclude the bronchial lymph nodes, as it was assumed that they would be unusually high in silica. The material thus obtained from each specimen of lung was hashed in a meat chopper. A weighed sample of the hashed lung was dried to constant weight at 100° C. The loss in weight at 100° C. is not recorded in our table as it represents the water content of the lung plus the volatile preservatives and is not a measure of the true value of any lung constituent.

The dried lung substance was then ashed in platinum in a muffle furnace

at low red heat. The weight of the residue was recorded as total ash. The ash was then treated with dilute hydrochloric acid at boiling temperature. The insoluble residue was washed, dried and ignited to constant weight which was recorded as the acid insoluble ash. The acid insoluble ash was then treated with hydrofluoric acid. This converted any silica present into silicon tetrafluoride which volatilized on heating. The loss in weight was recorded as silicon dioxide. It is interesting to note that the weight of the acid insoluble ash and the loss in weight after treatment with hydrofluoric acid were practically identical, showing that the acid insoluble ash was silicon dioxide without the admixture of other substances.

The total ash and the silicon dioxide are reported on the basis of per cent of dry lung substance. In order that our figures may be readily compared with those recorded by other workers we have included in our Table I a column showing the per cent silicon dioxide in the total ash. Some writers record their results as mg. per gm. of dried lung substance. Milligrams per gm. may be readily converted into per cent by dividing the mg. per gm. by 10, which will give gm. per 100 gm. or per cent. However, the majority of analysts in this field have recorded their results in terms of per cent SiO_2 in the dried lung substance or per cent SiO_2 in the total ash.

For the histological diagnosis in each

TABLE I

SHOWING PER CENT TOTAL ASH AND PER CENT SILICA OF DRIED LUNG SUBSTANCE

Case	Color	Age	Occupation	Histological Diagnosis		Ash Per Cent of Lung	SiO_2 Per Cent of Lung	SiO_2 Per Cent of Ash	Remarks
1	C	37	Driller	Silicosis 4 † Tuberculosis ?		8.12 5.97 *	2.16 0.33	26.60 5.53	Worked 52 weeks in tunnel 1930–1931; no previous mining experience; died 8/31/32.
2	W	45	Laborer	Silicosis 4 † Non-tuberculous pneumonia		6.16	3.10	50.33	Steel nipper in tunnel July, 1930 to latter part of Feb., '31. Had worked in mines 4 or 5 years. Died 10/12/32.
3	C	24	Laborer	Silicosis 1 † Tuberculosis		3.14 3.51	0.91 0.84	29.00 23.93	Steel nipper and gas dinky operator 10 months in tunnel 1931. No previous mining experience. Died 9/2/32.
4	C	29	Driller	Silicosis 4 † Tuberculosis	Left Right	6.35 5.85 * 8.08 8.24 *	2.69 1.37 5.09 1.97	42.36 23.41 63.00 23.93	June, 1931–March, 1932 (9 mos.) in tunnel. Died June 8, 1933. Had worked in coal mines of West Va. 3 or 4 years.
5	W	23	Laborer	Silicosis 4 † Tuberculosis ?	 Right Left	4.47 * 4.19 4.87	1.35 2.01 2.59	30.20 47.97 52.96	Approximately 7 years in coal mines of West Va. Laborer and steel nipper 52 weeks (1930–31). Died 9/25/32.
6	C	21	Laborer	Silicosis 4 † Tuberculosis		5.91 † 5.39 ‡	1.98 1.97	33.50 36.55	Mucker and drill helper 40 weeks in tunnel 1931. No previous mining experience. Died 12/7/32.
7	C	38	Driller	Silicosis 4 † Tuberculosis		5.56	2.58	46.40	No coal mining experience. Driller 66 weeks (1930–32), in tunnel. Died 2/5/33.
8	C	29	Driller	Tuberculosis		5.17 * 5.07	0.90 0.78	17.40 15.38	No previous mining experience, 58 weeks as driller (1930–31). Died 2/16/33.
9	C	34	Driller	Silicosis 4 † Tuberculosis		6.12	2.77	45.26	Previous industrial history unknown. 48 weeks (1931–32) as driller. Died April, 1933.

* Sample apparently normal on gross examination.
† Had appearance of red hepatization on gross examination.
‡ Had appearance of gray hepatization on gross examination.

case we are indebted to Dr. Leroy U. Gardner of Saranac Laboratory, and for the occupational history to Dr. L. R. Harless of Gauley Bridge, W. Va.

The purpose of silica determinations in cases of pneumoconiosis is to secure data from which may be derived some analytical criterion which would materially assist in making a differential diagnosis. The criterion might be an analytical value or a ratio between two analytical values. Both of these ideas have been tried.

In their paper on coal miners' lungs Cummins and Sladden [11] calculated a ratio between the combustible material of the lung and the silica content. This ratio was assumed to be an index of the severity of silicosis. In his most recent paper Sladden did not make use of this factor, but classified the intensity of his cases of silicosis on the basis of the per cent of SiO_2 in the dried lung substance. He concluded that when the dried lung substance contained more than 1 per cent SiO_2 the case was probably silicotic, and that when the per cent of SiO_2 in the lungs reached 1.6 there were practically no exceptions to the diagnosis of silicosis.

The literature contains several reports of the analyses of the total ash of lungs. In these reports the silicon dioxide is reported as per cent SiO_2 in the total ash. For a review of these cases reference is made to Dr. McNally's paper. Previous work may be summarized by stating that the older authors believed that silica was not present in the lungs of new-born infants. Three-quarters of a year was the time frequently quoted when silica first appeared. As the number of chemical analyses of lungs of persons of various ages and occupations increases it will probably be shown that the amount of silica in the lungs of normal individuals depends somewhat upon environment as well as upon age. It is obvious that the dust from paved streets or roads will be different in composition from that of unpaved roads. The composition of dust from unpaved roads will depend upon the nature of the soil in the locality. Normal individuals of the same age having lived all of their lives in different environments will undoubtedly show considerable variation in the silica content of their lungs.

Wells [12] in his *Chemical Pathology* states that lungs of individuals whose occupations do not expose them especially to dust inhalation contain increasing amounts of silicates in direct proportion to age; the silicates then constitute from 3.5 to 10 per cent of the total ash of the lungs.

The 9 cases reported in this paper were men who were engaged in the same project, namely, the construction of a tunnel through rock rich in silica. Their exposure to silica dust depended somewhat upon the nature of their occupation. Our analytical findings with the histological diagnosis and occupational history are recorded in Table I.

Since the purpose of the chemical analysis is to make the diagnosis more definite, some of our data ought to be capable of close correlation with data secured by an entirely independent method of diagnosis. The test will then be a comparison of the chemical findings with the histological diagnosis. If one compares the per cent of ash in the dry lung substance in each case with the histological diagnosis he will note a very good correlation, for the SiO_2 content of the lung increases with the severity of the case. On the other hand, if the severity of the case is to be determined chemically by the per cent SiO_2 in the total ash, the correlation fails. We believe therefore that the per cent SiO_2 in the dry lung substance is a much better criterion of silicosis than is the per cent of SiO_2 in the total ash. Our findings of SiO_2 in the dried lung substance agree essentially with those reported by Sladden.[5]

TABLE II

TYPICAL ANALYSES REPORTED IN THE LITERATURE BY OTHER INVESTIGATORS

Case	Author	Per Cent Ash in Dried Lung	Per Cent SiO_2 in Dried Lung	Per Cent SiO_2 in Ash	Remarks
1	McCrae [9]	4.54	1.39	30.7	African gold miner
2	"	6.46	1.90	29.4	" " "
3	"	5.47	2.23	40.8	" " "
4	"	9.30	4.47	48.0	" " "
5	"	6.49	2.98	45.8	" " "
6	"	6.51	2.81	43.2	" " "
44	McNally [4]	10.78 *	0.86 †	7.98	Mill stone sharpener
503	"	17.14 *	1.40 †	8.16	Stone cutter
327	"	12.36 *	0.24 †	1.94	Machinist
429	"	14.58 *	0.36 †	2.47	Engineering draftsman
463	"	19.99 *	0.43 †	2.15	Coal miner, 25 years
411	"	8.84	0.50 †	5.65	Stone quarry, 9 years
300	"	8.46	2.60 †	30.73	Granite cutter
446	"	5.59	1.09 †	19.50	Zinc miner
1	Pancoast and Pendergrass [13]	6.17	1.81	29.3	Sand blaster
2	"	8.01	3.29	40.6	Sand blaster
3	"	6.94	2.10	30.3	" "
4	"	6.59	2.45	37.2	" "
40	Sladden [5]		1.72		Coal miner
41	"		1.78		Potter
42	"		1.80		Coal miner
43	"		1.78		Coal miner
44	"		1.91		Repairer (coal mine)
45	"		1.98		Coal miner
46	"		2.08		Coal miner
47	"		2.16		Coal miner
48	"		2.28		Coal miner

* High ash due to Kaiserling solution used as preservative.
† SiO_2 calculated as per cent from milligrams per gram as reported.

For the purpose of comparison we have prepared Table II which contains data taken from the publications of other workers in the same field. In the case of Dr. Sladden's article only one section of his analytical report is reproduced. The case numbers in each instance are those of the original authors. In order that the compilation might be truly representative we have included reports from various parts of the world.

SUMMARY

The lungs of 9 workmen engaged in the same tunnel project have been analyzed.

There is a striking correlation between the per cent SiO_2 in the dried lung substance and the severity of silicosis as determined histologically.

CONCLUSION

The per cent SiO_2 in the dried lung substance is a better criterion of the intensity of silicosis than is the per cent of silica in the total ash.

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Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools*

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IN Memphis, during this summer swimming pool season, the 13 pools that have been operating were studied as a group in the routine health department control program. These pools present a variety of conditions with reference to design, equipment, bathing load, source or chemical quality of the water. They might be grouped into 4 general classes. Four of them are outdoor fill-and-draw pools, while 2 are indoor fill-and-draw pools. Three others are distinctly poorly designed from the standpoint of inlet location or slow rate of recirculation and 3 of the remaining 4 are fairly well designed as to inlet spacing and rate of recirculation but their ultra-violet ray machines have been abandoned and the disinfecting agent must be added by hand. The last of the 13 pools has been built this summer and is designed for an 8-hour "turnover" and with proper inlet and outlet locations to enable the maintenance of a uniform residual in all parts of the pool at all times, using chlorine alone as the disinfecting agent. This is the only pool which has been built within the last 6 years and the only one equipped to disinfect satisfactorily with chlorine alone.

The use of chloramines in swimming pool disinfection has therefore, been of special interest here because of:

1. Its ability to improve the distribution and maintenance of a uniform chlorine residual throughout all parts of the pool and for longer periods of time.

2. The increasing of the permissible upper limit of the chlorine residual. Residuals of up to 1 full p.p.m., if using ammonia with the chlorine. While using chlorine alone the upper limit is 0.5 p.p.m. without causing complaints of odors and smarting of the eyes.[1]

3. The definite saving in the cost of disinfection of these pools in past years, using ammonia with chlorine, over those using chlorine alone. For swimming pools having an 8-hour "turnover" period and a satisfactory number and spacing of inlets, the saving shown in the pool studied here would undoubtedly be misleading, as it was necessary in using chlorine alone to maintain excessive residuals in parts or streaks of the pool in order to have a slight, 0.1, or 0.2 p.p.m. of chlorine in other parts.

At the American Public Health Association Meeting in Washington last year, the usual method of collecting samples for bacteriological examination, that is the holding of the samples after collecting for a period of time before testing, was condemned as giving a false feeling of security. Mallmann and Cary [2] concluded:

Samples of swimming pool water collected during periods of use and tested immediately after collection showed more pollution than duplicate samples handled in the usual manner by storing and testing later. . . .

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

During periods of use, swimming pool water showed marked pollution as measured by colon bacilli and streptococci indices in the presence of residual chlorine contents of 0.2 to 0.5 p.p.m. . . .

A sodium thiosulphate treated sample bottle was recommended for collecting pool samples.

Because of the several advantages to be gained in using chloramines over the use of chlorine alone, and because of the above conclusions, it was decided to carry on the following studies relative to the use of chlorine and ammonia in connection with the routine control of all swimming pools during the months of June, July, and August, 1933.

1. Collect duplicate samples for every sample taken this season during times of swimming—one sample to be handled in the usual manner and tested after the inspector reaches the laboratory and the other sample collected in sodium-thio-sulphate treated bottles.

2. Run several laboratory tests to determine if sodium thio-sulphate treated bottles had any disinfecting effect on samples collected between the time of collection and the time of delivery at the laboratory.

3. Check at intervals the increase in the free ammonia content at those pools using chlorine and ammonia treatment where the water was recirculated and not completely drained in several weeks or longer.

4. The control of slime or algal growths on the bottom and sides of pools by using:
   a. An increased dose of chlorine.
   b. By the use of copper sulphate.

DETAILS OF THE STUDIES

Study 1. Comparison of Samples Collected and Tested in the Usual Manner and Those Collected in Sodium Thiosulphate Treated Bottles—

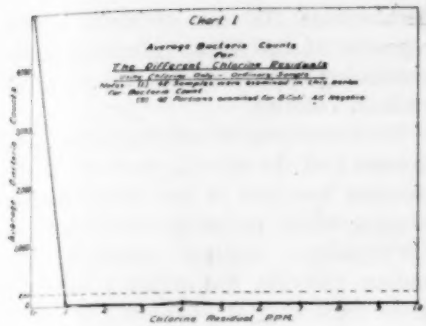
Two duplicate samples were collected twice a week from each pool. Two samples at each inspection collected and handled in the usual manner and tested after reaching the laboratory and two other samples collected in sodium thiosulphate treated bottles.

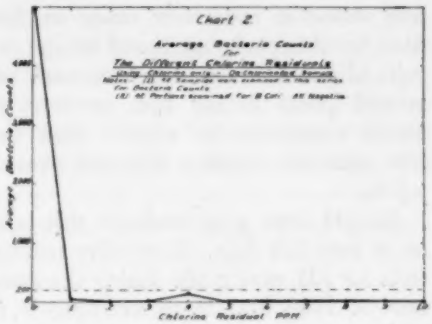
In the selection of a dechlorinating agent, the following chemicals were considered: sodium thiosulphate, sodium bisulphite, and sodium sulphite. Sodium metasulphite (which had been recommended to us by Dr. Schmelkes), was not obtainable on the market except as a special order in large quantities (J. T. Baker Chemical Co., Phillipsburg, N. J.). Of the three substances considered as antichlors, sodium thiosulphate seemed to be the most satisfactory for routine purposes. Both sodium bisulphite and sodium sulphite decomposed under steam sterilization and lost practically all of their dechlorinating power, a difficulty which was not encountered with the thiosulphate. While either the bisulphite or the sulphite could no doubt have been used under special conditions of preparation, for the purposes of routine use, the thiosulphate offered distinct advantages.

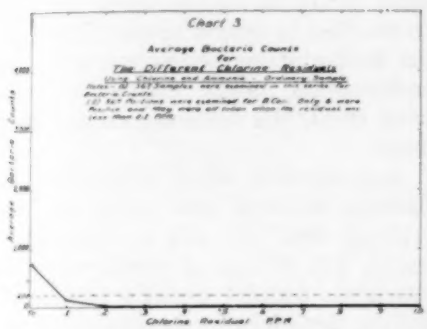
PREPARATION OF THIOSULPHATE TREATED SAMPLE BOTTLES

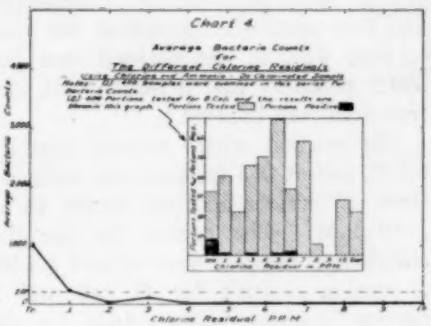
Ordinary 4 oz. wide mouth bottles with tinfoil covered corks and hood of heavier lead foil were used for collection of samples. The bottles were sterilized as usual in the hot air oven; 1.5 gm. of crystallized sodium thiosulphate were dissolved in a liter of sterile water and 1 c.c. of the solution added to each bottle; the bottles were then autoclaved for 5 min. at 15 lb. steam pressure. Bottles were freshly prepared for periods not exceeding 2 or 3 days but the stock solution of sodium thiosulphate was used over a longer period of time.

Chart 1 represents the results of 42 samples collected from 2 swimming pools where chlorine was used alone without the addition of ammonia. Average bacteria counts are plotted as the abscissa and the chlorine residuals as the ordinate. These studies showed that at a residual of 0.1 p.p.m., the average count was 6 and no single sample was above 12. Forty-two portions were run for *B. coli* content and all were negative. Chart 2 represents the re-









sults of the 42 samples collected, where chlorine was used alone, in sodium thiosulphate treated bottles. The average count was 44 when the residual was 0.1 p.p.m. The average count above this residual never ran more than 136.5 bacteria per c.c. Forty-two samples tested for *B. coli* were all negative. Chart 3 represents the results of 567 samples collected from 11 pools where chlorine and ammonia were used. The average count from the samples collected in the ordinary bottles at 0.1 p.p.m. was 136 and at 0.3 p.p.m. was 4. Five hundred and sixty-seven portions were tested for *B. coli* and there were 6 positives in portions containing less than 0.1 p.p.m. From 11 pools 408 samples were collected in bottles that had been treated with sodium thiosulphate to dechlorinate the sample at the time of collection. The average bacteria count at 0.1 p.p.m. was 220, and the average count at any chlorine residual above 0.1 p.p.m. never ran as high as 100 bacteria per c.c. as shown by Chart 4. A *B. coli* graph inset in Chart 4 shows the number of positive portions in black and the number of portions tested in the outlined bar.

The work of Schmelkes [3] showed that a high free ammonia content slowed up the reaction of chlorine on bacteria. It is interesting to note, however, that the positive *B. coli* samples at 0.6 p.p.m. and 0.5 p.p.m. were collected at times when the pH and free ammonia content were probably normal.

At a residual of 0.6 p.p.m. there were 2 positive *B. coli* portions out of 33 portions tested. The samples from which the 2 tests were made were collected at about 11 *A.M.* from a fill-and-draw pool 3 days after the pool had been drained, cleaned and filled with fresh water. The bacteria counts on the 2 samples were 10 and 20 for the dechlorinated samples and 2 and 2 for the ordinary samples with the *B. coli* for the ordinary samples negative. No

free ammonia tests were made on this date for this pool, but based on the results of a number of such tests made on several pools during this summer, it seems reasonable to assume that the free ammonia content was not over 1 p.p.m.

No pH tests were made on this pool on or near this date. Forty-five routine tests for pH were made during the summer of 1932 and these averaged 7.6, with a minimum of 7.3 and a maximum of 8.2. After checking the probable pH and free ammonia content of the pool on this day, it was decided that the water probably had a normal pH and free ammonia content.

The portion which showed positive for *B. coli* at 0.5 residual was collected from an outdoor pool on August 18 at 3:30 P.M. The counts for the dechlorinated samples were 40 and 8 with 1 portion positive for *B. coli* and 1 portion negative. The counts for the ordinary samples were 18 and 5 with both portions negative for *B. coli*. Unfortunately the records kept do not show the last date that the pool was drained previous to the collection of these 2 samples, nor did they show the pH of the pool water nor the free ammonia content. A free ammonia test on August 23 at this pool showed 1.04 p.p.m.

Study 2. Laboratory Tests to Determine If Sodium Thiosulphate Treated Bottles Had Any Disinfecting Effect on Samples Collected—

The amount of sodium thiosulphate used was found to be sufficient to dechlorinate 100 c.c. of water immediately and completely, in which the residual chlorine, as determined by the orthotolidin test varied from 0 to 1.5 p.p.m. of residual chlorine. There was always a considerable excess of thiosulphate present after dechlorination was complete. Experimentally the amount of sodium thiosulphate was sufficient to dechlorinate 100 c.c. of water or the capacity of the 4 oz. collecting bottle containing approximating 3.5 p.p.m. of residual chlorine.

With an excess of sodium thiosulphate present and the several products of the reaction involved in the dechlorination process, which probably include sodium tetrathionate, sodium sulphate, and sodium chloride, the question naturally arose regarding the possibility of sterilization or temporary inhibition of bacterial life in the dechlorinated samples. In an effort to determine whether or not the dechlorinating action or any of the end-products formed exerted a sterilizing effect, the following checks were made:

Approximately equal suspensions of bacteria recovered from water were inoculated into (1) 100 c.c. of sterile water; (2) 99 c.c. of sterile water to which was added 1 c.c. of a solution of sodium thiosulphate containing 1.5 gm. of crystallized salt per liter; and (3) and (4) duplicate samples of 49 c.c. each of sterile water to which were added 1 c.c. of sodium thiosulphate as above, and 50 c.c. of a solution containing residual chlorine in the amount of 2 p.p.m. Plates were made from the series of 4 samples at various times and for several series containing different numbers of organisms. (Results are shown in Table I.)

From the results obtained it would appear that little effect is exerted on the bacteria present and that probably the dechlorinated samples represent approximately the condition of the pool water at time of collection. (It is hoped that during the coming season conditions will permit the establishment of a portable laboratory at the municipal pool for actually checking this point.)

Study 3. Occasional Checks for Free Ammonia to Control Ratio of Chlorine to Ammonia Dosage—

TABLE I

RESULTS OF TESTS TO DETERMINE POSSIBLE STERILIZING EFFECTS OF DECHLORINATING PROCESS

Plate Counts

	Time from addition of chlorine to plating						
	0 hr.	1 hr.	2 hr.	6 hr.	24 hr.	48 hr.	1 week
Series I							
(1) Culture (into 100 c.c. sterile water)		6,200			12,000		18,000
(2) Culture plus (99 c.c. sterile water) plus 1 c.c. sodium thiosulphate		6,500			15,000		20,000
(3) Culture plus (49 c.c. sterile water) 1 c.c. sodium thiosulphate plus 50 c.c. chlorinated water		6,500			16,000		21,000
(4) Duplicate of (3)		6,600			15,000		18,000
Series II							
(1)	20,000					54,000	
(2)	22,000					60,000	
(3)	24,000					66,000	
(4)	24,000					60,000	
Series III							
(1)			50	62			
(2)			52	66			
(3)			52	68			
(4)			48	68			

Nitrite and Ammonia Determinations: Occasional checks were made on nitrite and ammonia content of various pools during the season. In all cases except one, the pools were being operated under normal conditions and no unusual results were obtained.

In the routine swimming pool control programs it was found difficult to control the ratio of ammonia to chlorine that is added by the pool operator, and it was also difficult to control the amount of free ammonia in the pool unless tests for free ammonia were made at times when the Health Department felt that the ammonia content might be increasing to a higher concentration. In the outdoor pools using chlorine and ammonia, the free ammonia content was kept down so that at no time did the free ammonia content run more than 1.3 p.p.m.

All of the outdoor pools using chlorine and ammonia found it necessary to drain and refill once every 2 weeks because of the increase in temperature of the water. In one of the indoor pools where the pool had been in operation for some 4 weeks, difficulty was encountered in maintaining a residual chlorine content in spite of heavy increases in chlorine dosage. Laboratory tests were made for nitrites, free ammonia, and albuminoid ammonia. The free ammonia content was 8 p.p.m. However, while duplicate

samples were collected twice a week from this pool, none of the portions tested for *B. coli* were positive. The pool was drained and refilled, and normal operations resulted. There is a possibility, of course, that the inspector, not realizing that the free ammonia content was so high, failed to wait long enough for the color to appear, inasmuch as the free ammonia would undoubtedly slow up the color reaction considerably.

Tests were made for free ammonia on the Municipal Fair Frounds Pool and it is interesting to note that after the pool had been operating for 3 days, after filling with clean water, the free ammonia showed, for one of the tests 0.48 p.p.m., and at another time 0.52 p.p.m. Nine days after the pool had been refilled with fresh water, the free ammonia content was 1.2 p.p.m., and 11 days after it showed 1 p.p.m. (See Table II.) This pool is one of those that was emptied every 2 weeks because of the temperature of the water. The ratio of ammonia to chlorine at this pool averaged approximately 1 to 3 for the months of July and August. Instructions were issued to all pools to dose with a 1 to 4 ratio of ammonia to chlorine for a few days after refilling and then cut to 1 to 10.

were made at the Fair Grounds Pool. This is a 1,125,000 gal., oval shaped pool with the deep water in the center, with a depth of about 3″ or 4″ all the way around at the outer edge and 10′ in the center. The inlets are spaced about 50′ apart all around and the turnover is approximately 48 hours. Several attempts to control algae by increasing the chlorine residual in the pool at night were unsuccessful due to the slow rate of recirculation and the necessary waste of water and addition of new city water in order to bring the residual back to below 1 p.p.m. within a few hours.

We quote from a paper read last year before this section regarding the effect of algal growth in using up the chlorine to the point of making it difficult to maintain a residual:

> It was also observed that an increase of the use of copper sulphate up to approximately 3.5 to 4 p.p.m. applied every third day, tended to reduce the chlorine demand, presumably by more effective control of algae.

While this dose of 4 p.p.m., or about 3½ lb. to 100,000 gal. reduced the chlorine demand, the dose was not strong enough or the application frequent enough to prevent the growth. The dose of copper sulphate was therefore increased and the frequency of application was increased until finally the growth of the slime or algae on the bottom of the pool had been completely and definitely prevented by using a 5 lb. to 100,000 gal. dose the last thing

TABLE II

Pool	Date Samples Collected	Interval between Draining & Collecting	Nitrites	Free Ammonia	Albuminoid Ammonia
Fair Grounds	7– 6–33	3	0	0.48 p.p.m.	0.74 p.p.m.
1–3 ratio	7–14–33	11	0	1.00 p.p.m.	0.194 p.p.m.
Ammonia to	8– 4–33	3	Trace	0.52 p.p.m.	0.034 p.p.m.
Chlorine	8–23–33	8	0.005 p.p.m.	1.20 p.p.m.	0.034 p.p.m.
St. Agnes	7–17–33	32	1 p.p.m.	8 p.p.m.	0.05 p.p.m.

Study 4. The Control of Algae With Copper Sulphate—

The studies made on the control of slime or algae by increasing the chlorine residual of the swimming pool

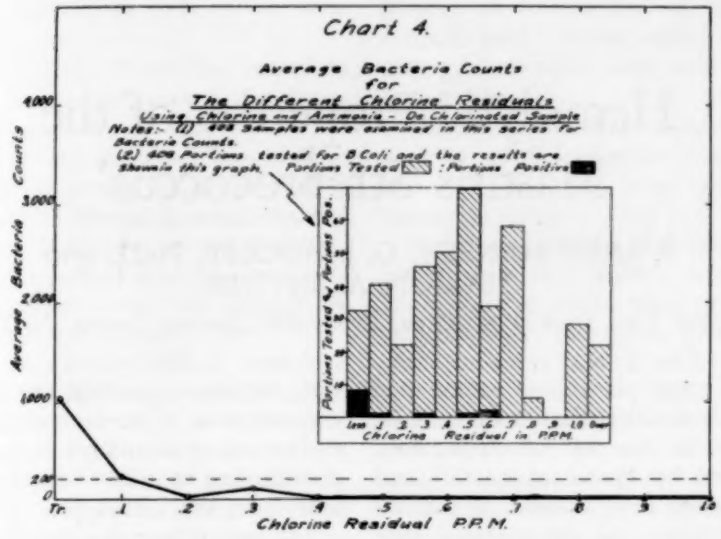


Chart 4.
Average Bacteria Counts
for
The Different Chlorine Residuals
Using Chlorine and Ammonia - On Chlorinated Sample
Notes:- (1) 408 Samples were examined in this series for Bacteria Counts.
(2) 408 Portions tested for B.Coli and the results are shown in this graph. Portions Tested : Portions Positive
Average Bacteria Counts
4000
3000
2000
1000
200
0
Portions Tested & Portions Pos.
Chlorine Residual in PPM.
Tr. .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0
Chlorine Residual P.P.M.

every second night after closing the pool. The copper sulphate was added by dragging 50 lb. in burlap bags around the pool to distribute it evenly. It was necessary to flush or skim the top of the pool each morning after dosing with copper sulphate because of the formation of a greenish oily scum.

OBSERVATIONS AND CONCLUSIONS

1. The decided advantage in the use of chloramines for disinfection of swimming pools having a slow rate of recirculation, poor spacing of inlets, hand application of chlorine, or those operated as fill-and-draw pools, and especially when the pool is out of doors, has prompted its use for another season.

2. The use of chloramines instead of chlorine alone requires certain extra tests and control to guard against its limitations. Some of these are:

a. The requirement of higher residuals, that is from 0.7 to 1 p.p.m.
b. The control of the ratio of ammonia to chlorine and of the free ammonia content in the water.
c. The control of the pH of the water routinely.
d. The collection of all samples in sodium thiosulphate treated bottles. (It is hoped that during the coming season it will be possible to establish a pool side laboratory for checking dechlorinated samples.)

3. The duplicate series of tests run this year on ordinarily collected samples and dechlorinated collected samples showed a lag in the killing power of chloramines over the chlorine on *B. coli*.

4. A moderate excess of sodium thiosulphate when used as an antichlor was found to have no disinfecting effect.

5. Copper sulphate definitely and completely controlled algae or slime growth at any pool where it occurred in Memphis if added every second night after closing at a dosage rate of 5 lb. to each 100,000 gal. of water.

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Hemolytic Properties of the Mastitis Streptococcus*

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BLOOD agar plates have gained wide use in the identification of bacteria, especially in the case of streptococci. Introduced by Marmorek (1902) and later, studied more in detail by Schottmüller (1903), the use of blood agar has come to be a useful procedure in identifying streptococci. Brown (1919) described in detail the various types of colonies produced on solid blood agar and emphasized the importance of using standard procedures and a standard means of designation. He divided the various types of colonies into groups, *viz.*, alpha, alpha prime, beta and gamma, these terms to apply only to deep colonies. The alpha type produces green coloration of the medium surrounding the colonies. Under low power magnification faint hemolysis may be noted in the outer portions of the zone. When a plate seeded with alpha hemolytic colonies is placed in the refrigerator after previous incubation of 48 hours at 37° C., an outer hemolytic zone will be noticed. The alpha prime type colony is intermediate between the alpha and the beta types. The colony is surrounded by a hemolyzed zone. This zone, however, is not clear and may, when viewed under low power magnification, be seen to contain the red blood corpuscles in a fixed condition. The surface colony should not be used in the classification as it may be indistinguishable from the beta type.

The beta type is characterized by the surrounding halo which is perfectly clear. No red blood corpuscles may be seen in this clear zone even when examined microscopically by magnification. The gamma type is produced by organisms which do not produce hemolysis or decolorize the blood medium. Brown calls both the alpha prime and the beta type, "hemolytic," yet the former is considered more closely related to the alpha than to the beta type.

The blood agar plate has been used widely in the case of the mastitis streptococcus. By a study of the literature it may be noted that no agreement is found regarding the hemolytic powers of this streptococcus. The typical streptococcus of mastitis (*Streptococcus mastitidis*) † is as a rule described as being alpha or gamma hemolytic, but not infrequently reports are found designating it as beta hemolytic.

Gminder (1912) tested 26 udder streptococci on the blood plate prepared

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† In this discussion the term *Streptococcus mastitidis* Migula will be used to designate the streptococcus associated with chronic or subclinical mastitis. The nomenclature of this organism will be subsequently determined. The use of this terminology at this time should not be construed to infer that the authors prefer this name to *Streptococcus agalactiae* Lehmann and Neumann.

according to Schottmüller. Four were hemolytic.

Puppel (1912) found that out of 18 mastitis streptococci, only 1 was hemolytic on human blood agar.

Jones (1918) described hemolysis in a number of strains which very probably could be termed *S. mastitidis*, but he states: "Mastitis caused by infections with non-hemolytic streptococci is more prevalent than that caused by other classes of microörganisms."

Ayers and Mudge (1922) examined streptococci originating from the udder. Of the 79 strains which were found to be *S. mastitidis*, 64 were of the beta hemolytic type, 15 of the gamma type. The blood medium used was prepared according to Brown and no sugar was added.

Carpenter (1925) found in 150 samples of milk from suspected cases of mastitis, alpha hemolytic streptococci in 79 per cent and beta hemolytic in 6.6 per cent of the cases. Whether the latter were *S. mastitidis* in a strict sense is impossible to say from the data presented.

Minett, Stableforth and Edwards (1929) found more than half of the strains they considered to be *S. mastitidis* bovis to be beta hemolytic and the majority of the remainder to be of the viridans type.

Bergey (1930) gives *S. mastitidis* as hemolytic.

Klimmer and Haupt state (1930): "*S. agalactiae* grows, in our experience predominantly as the alpha type, rarely according to the alpha prime type, comparatively frequently as the gamma type, never as the beta type."

Haupt (1931) never found beta hemolysis in *S. mastitidis*.

Minett, Stableforth and Edwards (1931) stated in answer to Haupt that *S. mastitidis* may be either alpha or beta hemolytic and pointed out that the variation in results between Haupt and themselves was caused by a difference in composition of the blood medium used. Haupt added 0.05 per cent glucose while they used a sugar-free medium.

Diernhofer (1932) mentions two varieties of *S. mastitidis*, one as anhemolytic and the other as a beta hemolytic variety.

Seelemann (1932) did not observe hemolysis in true mastitis streptococci. He tested 300 strains using red cells of ox and sheep and 80 on horse blood agar. In some cases a faint clear halo was observed. Steck (1932) examined 24 *S. mastitidis* strains on Brown plates and found that all were of the alpha type. Hadley and Frost (1933) use the name *S. mitis* for the alpha streptococcus responsible for the majority of cases of mastitis. They reserve the term *S. mastitidis* for beta hemolytic types.

Rosell (1933) examined the behavior of 268 strains of typical mastitis streptococci and found 3 only to be beta hemolytic, the remaining being of the alpha or gamma types, using horse and sheep blood in the Brown technic. On cow's blood 10 per cent of the strains were beta hemolytic. No sugar was added to the medium, but horse meat or Liebig's meat extract were recommended.

The disagreement between different authors in regard to the action of *S. mastitidis* toward blood media may be due to several reasons: (1) The name *S. mastitidis*, may be taken in too broad a sense including practically any streptococcus that may be isolated from the udder. (2) Differences in technic, composition of the medium, kind of blood, observation of surface colonies being the most important. (3) Difference in interpretation. Alpha prime colonies are, no doubt, frequently regarded as beta colonies.

The object of this discussion is to present data regarding the action on blood of authentic strains of *S. masti-*

tidis and the possible significance of this characteristic in the detection of udder infections.

TECHNIC

Freshly grown cultures were plated in the various media and examined after 48 hours' incubation at 37° C. The plates were then placed in the refrigerator, chilled for another 48 hours, and examined again. The media used were: (1) horse blood agar, prepared from fermented veal broth, (2) horse blood agar, prepared from plain veal broth, (3) horse blood agar, prepared from plain veal broth plus 0.05 per cent glucose, (4) sheep blood agar, prepared from plain veal broth plus 0.05 per cent glucose, (5) cow blood agar prepared from plain veal broth. The broth which constituted the basic part of all the media had the following composition:

Veal infusion from 500 g. veal	1,000 c.c.
Bacto peptone	10 g.
NaCl	5 g.
Agar	15 g.

Reaction adjusted to pH 7.4

The media were tubed in 12 c.c. lots and 0.6 c.c. of blood was added before use. The blood was always left at least 48 hours in the cold before being used for plating.

To supplement the results as secured with the blood agar plates, tests for hemolysin production were carried out in liquid media. One-half c.c. of an 18 hour culture in sugar-free broth was placed in a small test tube and 0.5 c.c. of 5 per cent washed suspension of sheep cells was added. The tubes were kept at 37° C. in a water bath and examined at regular intervals: 20 min., 1 hour, and 3 hours.

DISCUSSION

It is apparent (Table I) from a study of recognized strains of *S. mastitidis* that the majority are alpha hemolytic and a lesser number alpha prime, bordering on weak beta hemolysis. Distinct and vigorous beta hemolysis was never observed, regardless of the kind of blood or the presence or absence of glucose. This observation is especially significant when it is realized that some workers report that the same strain varies in different laboratories from alpha to strong beta hemolytic.

The types beta, alpha, alpha prime, and gamma may not represent distinct types in all cases and further study is needed to decide on the mechanism of hemolysis in the weak beta hemolytic strains. Hemolysis is a complicated process depending on many factors of which not all are fully understood. The quantitative importance of these various factors has never been worked out; productions of true hemolysins, of acid and of peroxide. It is probable that the various types of hemolysis for the time being should only be considered as rough descriptions which should be confirmed by quantitative measurements.

While it may be difficult or impossible to distinguish between the various types, the difficulty, frequently described, that a certain strain varies greatly from time to time when tested on blood plates has not been encountered. Different transfers of the same strain kept for years in different culture collections under varied conditions gave identical results. Many examples of this type are found in these data (see 1 and 17, 3 and 8, 6 and 9, etc. Table I).

Brown (1919) suggested that glucose even in small amount had a marked effect on the degree of hemolysis of colonies on blood plates. That the hemolysis is somewhat suppressed by the addition of glucose becomes especially important in the case of probable intermediate types. In a medium containing glucose certain strains (No. 49) may resemble the alpha prime type while in a sugar free medium the hemolysis is so pronounced

that it approaches the beta type. This circumstance explains in a satisfactory way the discord in the conception of Minett, Stableforth and Edwards (1931) on the one hand, and Haupt on the other, as the former investigators used a sugar-free blood medium and the latter one which contains 0.05 per cent glucose. Some variance in the appearance is found when different kinds of blood were used, but in the case of the strains here concerned the variation was not great and only 2 (No. 4 and No. 78) showed a sufficient difference to cause a placing into different types, *viz.*, alpha and alpha prime.

Agreement between the hemolysis on the plates and in the liquid medium was never perfect.

SUMMARY

Of 91 authentic strains of *S. mastitidis* being carried in various laboratories as typical streptococci associated with mastitis, 50 were of the alpha and 41 of the alpha prime hemolytic types.

The streptococcus commonly associated with chronic or subclinical mastitis always produces the alpha or alpha prime type of hemolysis on blood agar bordering on a slight beta hemolysis. Strong beta hemolytic strains were not found among the cultures. Two strains of streptococci from mastitis were beta hemolytic, but they were found by cultural studies to be different from the type generally found associated with mastitis.

A careful study of the authentic mastitis streptococci isolated from chronic cases reported to be beta hemolytic were found to be of the alpha prime type. This distinction is apparent when deep colonies are examined by a stereoscopic binocular microscope.

Blood from sheep, ox, and horse were used with similar results. The type of blood did not appear to affect the type of hemolysis produced on blood plates.

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(See Table I on the following pages.)

TABLE I

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
1	Amer. Type Cul. Col. #342. Originally obtained as *Streptococcus mastitidis*, from L. A. Rogers, Bur. Dairying, U. S. D. A. Washington, D. C. Isolated by S. H. Ayers, 1925.			a′	a′	a′	–	–	–	
2	Amer. Type Cul. Col. #4170. Originally obtained as *S. mastitidis*, from George Knaysi, N. Y. State Col. Agr., Ithaca. Isolated by him from milk, 1926			a′	a′	a′	–	–	–	
3	Amer. Type Cul. Col. #4784. Originally obtained as *S. mastitidis*, from F. S. Jones (No. N. Y. 21288A) Rockefeller Inst. for Med. Res. Princeton, N. J.	a′	a′	a′	a′	a′	–	–	–	Alpha prime to weak beta
4	Amer. Type Cul. Col. #4785. Originally obtained as *S. mastitidis*, from F. S. Jones, No. 6204. Rockefeller Inst. for Med. Res. Princeton, N. J.			a	a′	a′	–	–	–	
5	Amer. Type Cul. Col. #4786. Originally obtained as *S. mastitidis*, from F. S. Jones, No. 7363. Rockefeller Inst. for Med. Res. Princeton, N. J.			a	a	a	–	–	–	
6	Amer. Type Cul. Col. #4787. Originally obtained as *S. mastitidis*, F. S. Jones (No. K 32) Rockefeller Inst. for Med. Res., Princeton, N . J.			a	a	a	–	–	–	
7	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus hemolytic, 1932. L. H.	a′	a′	a′	a′	a′	–	–	–	Very broad zones produced round colonies on cow blood but corpuscles near the colony are visible Alpha prime to weak beta.
8	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus, hemolytic, N.Y. 21288A. Identical with 3.	a′	a′	a′	a′	a′	–	–	–	Alpha prime to weak beta
9	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus, nonhemolytic. K 32. R. F. Identical with 6.			a	a	a	–	–	–	
10	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus, nonhemolytic. 7363. R. H. Identical with 5.			a	a	a	–	–	–	
11	J. Howard Brown, Johns Hopkins Univ. ag. 217. *S. mastitidis.*	a′	a′	a′	a′	a′	–	–	+	Alpha prime to weak beta
12	J. M. Sherman, Cornell Univ. #2. *S. mastitidis.*	a′	a′	a′	a′	a′	–	–	–	Alpha prime to weak beta

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
13	J. M. Sherman, Cornell Univ. #5. *S. mastitidis.*			a′	a′	a′	−	−	−	Broad zones on cow blood
14	J. M. Sherman, Cornell Univ. #16. *S. mastitidis.*			a′	a′	a′	+	+	+	
15	Nat. Col. Type Cul. London, No. 3481. Originally obtained from Amer. Type Cul. Col. 4767.	a′	a′	a′	a′	a′	−	+	+	Alpha prime to weak beta
16	Nat. Col. Type Cul. London No. 3482. Amer. Type Cul. Col. 4170. Identical with 2.			a′	a′	a′	−	−	−	
17	Nat. Col. Type Cul. London, No. 3483. Amer. Type Cul. Col. 342. Identical with 1.			a′	a′	a′	−	−	−	
18	Nat. Col. Type Cul. London No. 3484. Amer. Type Cul. Col. 4768.			a	a	a	−	−	−	
19	Nat. Col. Type Cul. London No. 3444. F. C. Minett, Roy. Vet. Col. London, #6.			a′	a′	a′	−	−	−	
20	Nat. Col. Type Cul. London No. 3445. F. C. Minett, Royal Vet. Col. London, #32.			a	a	a	−	−	−	
21	Nat. Col. Type Cul. London No. 3446. F. C. Minett, Royal Vet. Col. London, #57.			a	a	a	−	−	−	
22	Nat. Col. Type Cul. London No. 3523. J. Howard Brown, Johns Hopkins Univ. Table 1. Group 2. No. 4. (*J. Infect. Dis., 38*, 381). Identical with 11.	a′	a′	a′	a′	a′	−	−	+	Broad zones on cow's blood. Alpha prime to weak beta
23	M. Klimmer, Veterinär-Hygienisches Institut der Univ. Leipzig. *Streptococcus agalactiae* #1.			a	a	a	−	−	−	
24	Ditto #2			a	a	a	−	−	−	
25	" #3			a′	a′	a′	−	−	−	
26	" #4			a	a	a	−	−	−	
27	" #5			a	a	a	−	−	−	
28	" #6			a′	a′	a′	−	−	−	
29	" #7			a′	a′	a′	−	−	−	
30	" #8			a′	a′	a′	−	−	−	
31	" #9			a	a	a	−	−	−	
32	" #10				a′	a′	−	−	−	
33	" #11			a	a	a	−	−	−	
34	" #12			a′	a′	a′	−	−	−	
35	" #13			a′	a′	a′	−	−	−	
36	" #14			a	a	a	−	−	−	
37	" #15			a	a	a	−	−	−	

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
38	Ditto #16			a	a	a	–	–	–	
39	" #17			a	a	a	–	–	–	
40	" #18				a	a	–	–	–	
41	" #19			a	a	a	–	–	–	
42	" #20			a	a	a	–	–	–	
43	M. Seelemann, *Preuss. Versuchs- und Forschungsanstalt für Milchwirtschaft, Kiel. agalactiae* #5681			a	a	a	–	–	–	
44	Ditto #L124			a	a	a	–	–	–	
45	" #L114			a	a	a	–	–	–	
46	" #5682			a	a	a	–	–	–	
47	C. Stableforth. Roy. Vet. Col. London. *S. agalactiae* strain #6. Identical with 19			a′	a′	a′	–	–	–	
48	Ditto #57. Identical with 21			a	a	a	–	–	–	
49	" #84. " " 66	a′	a′	a′	a′	a′	–	–	–	Difficult to determine, zones narrow, but practically no cells close to colony in cow's blood. Alpha to weak beta
50	" #101 " " 67			a′	a′	a′	–	–	–	
51	" #108			a′	a′	a′	–	–	–	
52	" #111			a′	a′	a′	–	–	–	
53	J. M. Rosell, Institut Agricole d'Oka, P. Q. Canada, #1. Mastitis streptococcus			a	a	a	–	–	–	
54	Ditto #2			a	a	a	–	–	–	
55	" #3			a	a	a	–	–	–	
56	" #4			a	a	a	–	–	–	
57	" #5			a	a	a	–	–	–	
58	" #6			a	a	a	–	–	–	
59	" #7			a	a	a	–	–	–	
60	" #8			a	a	a	–	–	–	
61	" #9			a	a	a	–	–	–	
62	" #10			a	a	a	–	–	–	
63	" #11			a	a	a	–	–	–	
64	" #15			a	a	a	–	–	–	
65	Nat. Col. Type Cul. London. *S. agalactiae*, No. 3850. A. W. Stableforth, Roy. Vet. Col. London. (*J. Comp. Path. & Ther.*, *45*, 185). Gr. I, Type Ia "49".			a′	a′	a′	–	–	–	

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
66	Ditto. #3851. Gr. I. Type Ib "84" Identical with 49.			a′	a′	a′	−	−	(+)	
67	Ditto. #3852. Gr. I. Type Ic 8101 Identical with 50.			a′	a′	a′	−	−	−	
68	W. D. Frost, Univ. Wis. *S. mastitidis*, U. W. 20-2.	a′	a′	a′	a′	a′	+	+	+	Alpha prime to weak beta. Very broad zones on cowblood agar, but corpuscles present near colony.
69	Ditto. *Streptococcus mitis*, U. W. 26-2.			a	a	a	−	−	−	
70	Ditto. *S. mitis*, U. W. 3-4.			a	a	a	−	−	−	
71	Ditto. *S. mitis*, U. W. 24-2.			a	a	a	−	−	−	
72	Gminder, *Wurtt. Tierärztliches Landesuntersuchungsamt. S. agalactiae.* Allgäuer strain			a′	a′	a′	−	−	−	
73	Ditto. Maulbronn strain			a′	a′	a′	−	−	−	
74	" Stuttgart strain			a′	a′	a′	−	−	−	
75	K. Diernhofer, *Tierärztliche Hochschule*, Vienna. *S. agalactiae*, S II.			a	a	a	−	−	−	
76	Ditto. S I			a	a	a	−	−	−	
77	" R 6			a	a	a	−	−	−	
78	Ditto. Beta hemolytic in ox-blood agar, without glucose.	a	a	a	a′	a	−	−	−	An almost clear zone produced on sugar free cow's blood agar.
79*	K. Diernhofer, *Tierarztliche Hochschule*, Vienna. *Streptococcus dysgalactiae.*			a	a	a	−	−	−	
80*	Ditto. *Streptococcus uberis.*			a	a	a	−	−	−	
81*	Nat. Col. Type Cul. London, #3857. K. Diernhofer, *S. dysgalactiae.*			a	a	a	−	−	−	
82*	Ditto. #3858. K. Diernhofer, *S. uberis.*			a	a	a	−	−	−	
83*	Ditto. #3859. K. Diernhofer, *S.*			a	a	a	+	+	+	
84	E. Mejlbo. *København Torve- og Slagtehaller Copenhagen.* Streptococcus from mastitis; strain, Bay.			a	a	a	−	−	−	
85	Ditto. Edelgave #156.			a′	a′	a′	−	−	−	
86	" " #1			a	a	a	−	−	−	
87	" " #87			a′	a′	a′	−	−	−	
88*	" Kragh.			β	β	β′	+	+	+	
89*	" Neo-Simonsen			β	β	β′	+	+	+	

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
90*	Ditto Simonsen			a′	a′	a′	+	+	+	
91	" Tryggevaelde			a′	a′	a′	+	+	+	
92	" Östrupgaard			a	a	a	−	−	−	
93	W. Steck, Universität Bern. *S. agalactiae.* #0113.			a′	a′	a′	−	+	+	
94	Ditto. #0148			a′	a′	a′	−	−	−	
96	" #065			a′	a′	a′	−	−	−	
97	" #0238			a′	a′	a′	−	−	−	
98	" #0203			a′	a′	a′	−	−	−	
99	" #0137			a	a	a	−	−	−	
100	N. Y. Agr. Exper. Sta. Geneva, N.Y. Subclinical mastitis. D13.			a	a	a	−	−	−	

* Culturally found not to be *S. mastitidis.*

Outbreak of Erythema Infectiosum in Elmsford, N. Y.

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IN March, 1933, the Westchester County Health Department was asked to assist in the diagnosis of a case of erythematous eruption in a young child living in Elmsford, a village of 3,000 population. At the time a tentative diagnosis of erythema multiforme was made by one of us (E. H. M.). A few days later a similar case was seen by another member of the department staff and the same diagnosis made. Within the next few weeks the local public health nurse and school nurse discovered what seemed to be a rather extensive outbreak of the disease, confined entirely to children below the age of adolescence. With the knowledge of the occurrence of so many cases all confined to one age group, the diagnosis of erythema multiforme seemed to be out of the question. The nurses were asked to gather together as many of the cases, both new and old, as could be found for reëxamination by both of us.

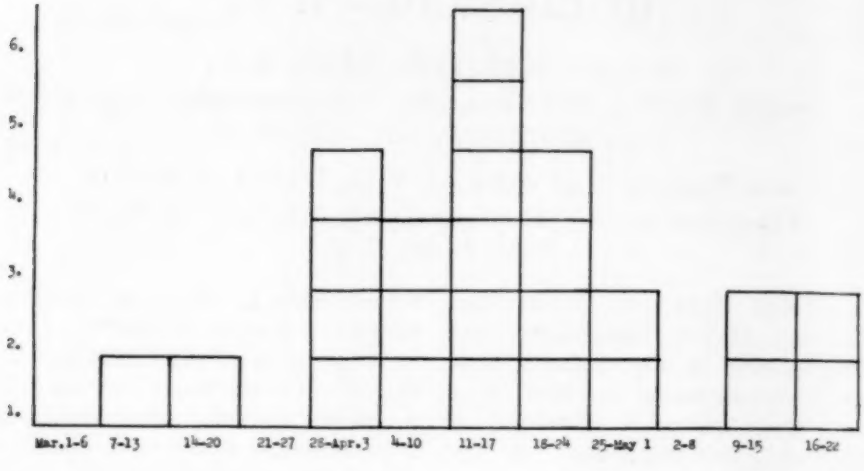
On April 28 about 20 cases were brought together, the youngest 3 years of age, the oldest 13. All had had the eruptive disease during the previous 4 weeks and all but one or two showed signs of the eruption. The eruption consisted of a (subjectively) asymptomatic reticulated erythema found in nearly all cases on the arms and legs; in a few the upper trunk and neck were also involved, while in one or two there was distinct flushing of the cheeks. In one of the cases seen earlier there had been in addition to the distribution described, a distinct butterfly patch across the nose, extending to the malar eminences. A very few of the children had signs of chronic tonsillar infection; some of the more recent cases showed redness of the fauces and tongue; while in one fresh case there were distinct well marked patches on the tonsillar pillars and buccal mucosa. Such conditions were exceptional, however, oral manifestations not being noted in most cases; nor was there any history of sore throat in the majority.

As a result of this reëxamination it was determined that the outbreak was one of erythema infectiosum (Ringelröteln), (Fifth Disease). The first clinical report of this malady was in 1925, by Herrick,[1] who recorded in a most complete article 74 cases. He stated that the disease was accurately described in the German literature in 1886, was recognized as a distinct entity in 1896, and given the name "Erythema Infectiosum" in 1899. There have been reported epidemics of the disease in Germany, Italy, France, Netherlands, Manchuria, and in the United States in Utah, St. Louis, Cleveland, Albany, Hamburgh, N. Y., and Branford, Conn.

CHART I

25 CASES OF ERYTHEMA INFECTIOSUM, ELMSFORD, N. Y. 1933

Distribution by Week of Onset



The description of the disease recorded by Smith [2] conforms closely to the eruptions observed by us. With no prodromal symptoms the eruption appears on the face, chiefly the cheeks, in the form of a bluish-red flush, rather sharply demarcated and on close inspection is seen to be composed of macular elements. Sometimes a distinct butterfly patch is observed. At first glance the eruption resembles erysipelas although it is readily seen that there is no induration nor co-lateral edema. There may be a burning sensation with possible itching [3] (absent in all of our cases). On the second day the eruption appears on the outer surfaces of the arms and legs, the buttocks, and less often on the trunk. The rash spreads peripherally and as it fades in the central portions, gyrate map-like mottling remains which often persists for as long as 3 weeks, following the initial eruption. The duration varies from a few days to several weeks, sometimes fading almost completely only to return, fade and return many times. A brisk rubbing often makes the rash more noticeable. Shaw [4] describes an evanescent vermilion coloring of the tip and edges of the tongue which may appear and disappear during the course of an examination.

There is no lymphadenitis and seldom any fever, at times there is slight temporary gastrointestinal disturbance and occasionally redness of the throat has been observed. The leucocytes may at first be diminished and then slightly increased, the eosinophil count ranging from 5 to 10 per cent.

The disease is of unknown etiology. It is unquestionably infectious and communicable but the symptoms are of so little moment that isolation is not warranted and no treatment is required. It occurs mainly among children of from 4 to 12 years of age and apparently is more common in the spring and summer months. The incubation period seems to be from 4 to 14 days.

Erythema infectiosum must be differentiated from erysipelas, German measles, scarlet fever, measles and erythema multiforme.[5]

This report is of interest chiefly in

adding another place to the list of communities in which erythema infectiosum has been identified and in recording such limited epidemiological data as were discovered, although much of this is of a negative character.

The present series of cases totalled 25 and the likelihood of there having been any considerable number of unobserved cases is slight. The local physicians were on the alert for the disease and the public health nurse and school nurse of the village were in touch with almost every family in the community. Indeed, it was only through their efforts that this group of cases was assembled. The age distribution was from 3 to 13 years, most of the group being under 10 and nearly one-third under 6 years of age. The cases were distributed almost evenly as to sex.

The outbreak extended over a period of 11 weeks, the first case having had its onset March 10, the last 2 during the third week of May. The week during which the largest number of cases occurred was that of April 11–17, the sixth week of the outbreak. The accompanying chart shows the cases by week of onset. It is apparent that the evolution of the outbreak was gradual and that its subsidence was equally slow, showing that there was probably no common source of infection and that in all probability the disease spreads by contact.

There were 4 instances of multiple cases in one family. In the first family 1 child's onset was March 18, the other April 3, a 16-day interval; in the second the onset in 1 child was April 16, in the other 4 days later; in the third there was a 4-day interval between cases; in the fourth family 2 of the cases occurred simultaneously on April 13, the third case 8 days later. In addition to these 1 child whose onset was March 18 lived next door to and played with the child whose onset was March 10. These intervals correspond closely to the belief previously noted that the incubation period is from 4 to 14 days.

In the two schools in the village there was practically no difference in incidence among the pupils. Most of the children came from clean houses and from families of moderate means. The cases were scattered irregularly throughout the village, there being no well defined geographic concentration.

As to possible etiology, no logical cause was discovered. This is consistent with the intensive investigation and careful clinical reports by Lawton and Smith,[6] in 1931. The water supply of Elmsford is of good sanitary quality and is secured from the Catskill aqueduct, part of the New York City supply. All of the milk sold in the village is produced and distributed under the supervision of the Westchester County Department of Health and is obtained chiefly from two of the largest distributors covering New York City and the surrounding suburban territory. Furthermore the distribution of cases was such that no one milk supply could possibly be implicated. Most of the usual foods supplied to the residents of the village, were secured from one or another of several chain stores operating in the community. Evidence suggesting any one store or any one food as the source of the outbreak was lacking. About 25 per cent of the village is sewered, the residents of other property relying on cesspools or septic tanks for sewage disposal; there are few, if any privies. There is no evidence of correlation between the cases and the method of sewage disposal.

Both whooping cough and chicken pox were prevalent in the community during the time of this outbreak, but apparently the cases of erythema infectiosum were not more common among the children who had either of these diseases or had been exposed to them. It was suggested that immunization against diphtheria by toxoid, or the use

of pertussis vaccine in the treatment and prevention of whooping cough might have been causative factors, but only 2 of the cases in our series had had any such treatment during the few months immediately preceding the outbreak.

SUMMARY

During the spring of 1933, an outbreak of erythema infectiosum occurred in the Village of Elmsford, Westchester County, N. Y. There were 25 cases ranging in age from 3 to 13 years. The outbreak extended over a period of 11 weeks and apparently was spread by contact infection. Evidence pointing to any definite etiology is negative. The disease is characterized by a typical eruption accompanied by few, if any, other symptoms. From a study of the literature and this present outbreak it would seem to be logical to believe that outbreaks of this disease may be fairly common but unrecognized.

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Pulmonary Asbestosis*

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THE manufacturing of asbestos products in the last few years has assumed a somewhat greater importance in the industrial world. Although the total number of workers in asbestos mills is probably far smaller than in many other lines of trade, their health is of paramount importance. The conditions surrounding the greater proportion of the employees constitute a distinct and serious industrial hazard, and often sufficient devices for protection have not been provided. It is doubtful if any single employee in certain departments of these mills can possibly escape some damage to his respiratory system because of the unavoidable inhalation of asbestos dust. Naturally, the longer the service of an employee, the more certain is more or less extensive pulmonary damage.

Asbestos is composed principally of magnesium silicate in crystalline hydrated form, always found with other minerals, particularly iron and magnetite, and usually contains about 2.6 per cent free silica. The rock is blasted in open quarries, being afterward crushed and pulverized, although often the pulverizing is done at the mill where the finished product is produced. At the mill the fibers are mixed with other fibers, usually cotton, then carded and spun by processes very similar to those employed in the production of cotton goods. In all of these processes a considerable quantity of asbestos dust is produced. Cooke states that the asbestos fiber microscopically consists of two different elements, (1) the glistening material which constitutes the bulk, and (2) black opaque angular particles. The dust contains these particles and minute granules. Analysis of samples showed that the dust with the greater quantity of these black particles contained the largest amount of iron. As the dust contained 18.4 per cent of iron and the finished product only 0.1 per cent, Cooke concluded that the black brittle parts of the fiber are the cause of the dust, and the danger to the health of the workers. Since the asbestosis bodies found in the sputum of disabled workers have been found to have cores which appear to be asbestos fibers around which has been deposited some kind of material from the living tissues, the iron-containing particles cannot be the sole cause of the condition. In fact, Gloyne, in 1929, showed that the core of the "asbestosis body" is an asbestos fiber.

The "dusty trades" for a long time have been considered inimical to the health of employees. In spite of this it has only been within the last 10 years that "pulmonary asbestosis," a disability resulting from working in one of the dustiest of trades, has been to any appreciable extent recognized. The first recorded case of "asbestosis" was reported by Dr. H. M. Murray at Charing Cross Hospital in 1900, and his diagnosis was supported by necropsy findings. The man was the only survivor of 10 who had worked in the carding room of an asbestos mill 10 years

* Read before the Industrial Hygiene Section of the American Public Health Association, at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

previously. From 1900 to 1924 not a single case report of the condition appears in the literature. In 1924 Cooke [1] published an autopsy report on a case who had worked in an asbestos plant for 20 years. Cooke thought this was the first case to be reported. After having learned of Murray's case, in 1927, he wrote a second article describing in more detail the pathological findings in his case.

McDonald,[2] in 1927, published an article on the microscopic appearance of lung tissue in asbestosis, his material having been obtained from Cooke's case. In 1928, Simson [3] reported the findings in lung sections from 4 asbestos workers, 2 of whom died from pulmonary tuberculosis and 2 from pneumonia. The author discussed at length the "golden-yellow bodies" now known to be pathognomonic of asbestosis. Page and Wood,[4, 5] in 1929 and 1930 recorded 2 autopsies. Lynch and Smith [6] reported the complete autopsy findings in a case which apparently died of pulmonary asbestosis, and had previously reported 2 autopsies on asbestos workers, 1 of whom died of gunshot wounds and the other of lobar pneumonia. They had been able to find only 172 cases of pulmonary asbestosis in the literature up to 1931, and post-mortems had been made in only 18 of these, 9 of which were complicated by other diseases and 1 a traumatic death. Since 4 reports were not completed, there remained at that time (1931) only 4 records of uncomplicated pulmonary asbestosis.

Since 1931 the reports of cases diagnosed as pulmonary asbestosis have been more or less fragmentary, being, in the main, adaptations of pathological facts from the previous post-mortems to the individual diagnosis in each case. Special stress has continuously been laid on the finding of "asbestosis bodies" in the sputum in order that the diagnosis may in no way be doubtful.

The principal pathological findings are pleurisy, extensive fibrosis in the parenchyma of the lung, usually over the mid-portions and bases, and the contraction of the lungs due to this fibrosis. The finding of asbestos fibers and asbestosis bodies is a usual feature, although they cannot always be demonstrated in the sputum of the living case. The fibrotic changes in the lung are the result of the low-grade inflammatory reaction caused by the asbestos fibers, which are supposed to act both as a mechanical and a chemical irritant. The mechanical irritation is evidenced by the large amount of granular dust and the larger angular particles found in microscopic sections. The chemical action is probably due to the presence of silicic acid, or silica, in the mineral, which is usually estimated at 2.6 per cent. Asbestos is very slightly soluble, and the formation of asbestosis bodies and pulmonary fibrosis are supposed to be due to this irritant action.

Gardner and Cummings [7] studied the production of experimental asbestosis in animals. Guinea pigs, rats, and rabbits were exposed to heavy concentrations of asbestos dust for varying periods, some as long as 2 years. In guinea pigs killed after 847 days of exposure, as well as some with a much shorter term, the authors found that the dust did not reach further than the bronchioles, whereas other dusts are usually deposited in the terminal air sacs and alveoli. This difference in localization they decided was due to the fact that asbestos dust is invariably principally elongated fibers. Along the bronchioles more or less mild inflammatory reaction was found, and fibrous tissue was formed after 1 to 2 years' exposure. After 782 and 840 days' exposure the pleura was involved with sub-pleural grayish white nodules 1 mm. in diameter, pleurisy being frequent in animals which had been long exposed. After 1 year's exposure the X-ray films

of guinea pigs showed definite pathological changes of a fibrotic character. Asbestosis bodies were found to be abundant in the regions around the bronchioles, but less so elsewhere. The condition appeared to follow the course of a slowly spreading fibrosis, even when not complicated by a tuberculous infection.

The so-called "asbestosis bodies," which are usually considered pathognomonic of asbestosis, are never found in crude asbestos. They are invariably found in lung sections, from expressed lung juice, and very frequently in the sputum of patients. They are undoubtedly formed by the deposition of certain material around the inhaled asbestos fibers. Fissures form in this material and the body separates into segments. More than 40 different varieties have been found, varying from golden-yellow to a mahogany-brown. They do not stain with the ordinary tissue stains, but frequently give the Prussian-blue reaction for iron, probably because of iron derived from the tissues. The bodies may be found in the centrifuged material from sputum which has been digested with 10 per cent sodium hydrate, and they vary considerably in length and breadth as they do in form. They are often found with one or both ends encased in phagocytic cells, and frequently phagocytes are seen containing fragments. It has been demonstrated by dissolving the bodies in concentrated sulphuric acid that the middle is composed of actual asbestos fibers, which are very slightly soluble.

The symptoms and physical signs of pulmonary asbestosis simulate to a considerable degree those of fibroid tuberculosis, or atrophic pulmonary emphysema, and because of this many of these cases have previously been diagnosed pulmonary tuberculosis. A few of them are complicated by a tuberculous condition, but not by any means as frequently as in silicosis. No conclusive proof that asbestosis renders an indivadual more susceptible to an active tuberculous infection has been given. In my series of cases I have been unable to deduce any proof that the condition has any tendency even to cause an exacerbation of activity in an old tuberculous process. The symptoms of the condition, with the exception of dyspnea, are rarely extreme. The skin frequently has an unhealthy somewhat sallow hue, and occasionally, especially in cases with long exposure to inhalation of the dust, one notices slight clubbing of the fingers, although this is far from constant. There is loss of appetite and often slowly progressive loss of weight, with accompanying lassitude. These patients almost invariably complain of chest pains, due to the tendency of the condition to involve the pleura. The cough is variable, often not excessive, and the sputum is usually scanty, being of a tenacious mucoid character. There may be blood-streaked sputum, or definite small hemorrhages, but this occurrence is fortunately not frequent. The temperature as a rule is not elevated to any appreciable extent. The most prominent and distressing symptom is dyspnea, which, very frequently, is extreme. In fact, this symptom usually first calls to the attention of the patient his need of medical attention, and renders him incapable of earning a livelihood. Sometimes, especially after an exposure over a period of years, the dyspnea grows progressively worse even though there has been a cessation of exposure for a considerable period of time. Occasionally this symptom is so distressing that it precludes any form of muscular exertion.

The physical signs of pulmonary asbestosis are principally those of pulmonary fibrosis, usually considerably more extensive over the lower two-thirds of the lungs. There is frequently some muscular atrophy over the chest,

and expansion is very much restricted. The percussion note over the whole chest is higher-pitched than normal except in the apices where the note is frequently resonant, probably because of compensatory emphysema. Although invariably bilateral, the impairment of resonance is more marked on the right side. The physical signs on auscultation are diminished to feeble breath sounds, prolonged and roughened expiration, and either dry crackles, moist râles, or both, usually over the lower half or two-thirds of the lungs. On the whole, the physical signs are quite similar to those found in uncomplicated silicosis, fibroid tuberculosis, or atrophic pulmonary emphysema. There are no definite physical signs distinctive of the condition. Signs are supposed to develop in less than 10 years' exposure, but they are frequently discovered within 2 years. The shortest time in my series of cases, from exposure to the development of symptoms and physical signs, was 18 months. The continuously progressive cases often develop extensive bronchiectasis, or engorgement of the right heart with progressive heart failure as a terminal result. Bronchopneumonia is frequently a serious complication.

The X-ray films show a somewhat distinctive picture. According to Merewether,[8] if films of asbestosis subjects be compared with those of victims of silicosis, the amount of disease in the former will be underestimated, because of inherent differences in the underlying pathology. The nodular distribution of the fibrosis in patients with silicosis is not often found in asbestosis. In the earlier stages of asbestosis the films present what has been frequently called a ground glass appearance. Later there is more definite mottling, but the lesions are never as dense as those of silicosis; consequently, it is difficult to divide the progress of the condition into stages. Stereoscopic films show that the ground glass appearance is caused by the development of a very fine fibrosis, and this is almost invariably seen to be much more extensive in the basal portions of the lungs.

Evidence of pleuritic involvement is often indicated by obliteration of the costo-phrenic angles, and flattening or peaking of the diaphragm. Often the diaphragm is indistinct in outline. The films sometimes show some thickening of the parietal pleura. The outline of the heart shadow is often " shaggy," the degree depending on the length of time of exposure to the dust. Occasionally calcareous deposits are seen not only around the hilum of the lung, but scattered in the parenchyma as well. On the whole, in well advanced cases of asbestosis, X-ray films do not show the amount of pathological change that one would expect from the clinical signs and symptoms. Even the most severe cases do not show such definite X-ray evidence as is seen in silicosis, although the area of involvement is usually somewhat extensive.

During the past 3 or 4 years I have collected 15 cases of asbestos workers who have been referred to our chest clinic because of symptoms referable to the respiratory system. With one exception, these have had a diagnosis of pulmonary tuberculosis. Invariably their principal and most distressing symptom has been dyspnea, in combination with slight or more severe cough, lassitude and progressive although gradual loss of weight.

Having had occasion some years ago to familiarize myself with the conditions in asbestos factories, I have since been intensely interested in determining the extent of the industrial hazard in this type of work. For that reason I have attempted to obtain X-ray films of the lungs of all asbestos workers who have been referred to the clinic because of respiratory symptoms. Of the films taken, only 3 have failed to exhibit

some definite evidence of the condition called pulmonary asbestosis. Although this series is comparatively small, it seems reasonable to conclude that this condition is far more frequent among asbestos workers than is usually supposed, in spite of the increased attention paid to the condition in the past 4 or 5 years.

Case histories with the X-ray films of 3 patients may be of interest. All of the cases are still living, although totally disabled. I have not been able to demonstrate asbestosis bodies in the sputum, which should not be absolutely necessary for a diagnosis when the X-ray film shows unmistakable pathology, and the physical signs indicate more or less widespread involvement.

Case I—D.S.W., white male, age 64 years. Came under observation Jan. 8, 1929. His complaint for 6 months had been cough and dyspnea, combined with anorexia and loss of weight. He had worked for 18 months in the card room of an asbestos plant with no protective devices. He had considerable cough, although the amount of sputum was not large and was negative for tubercle bacilli. There was a history of only a very slight rise of temperature at any time. There was slight hoarseness at times. The expansion was noticeably deficient over the whole chest and the resonance was slightly impaired over the lower lobes. The breath sounds were prolonged anteriorly over the mid-portion of the lungs, and, posteriorly, from the middle of the scapula to the base. Over the latter region there were many dry crackles and moist râles.

The X-ray films showed considerable thickening around the hili. The heart outline was shaggy, and both costo-phrenic angles were obliterated. The diaphragm was irregular and indefinite in outline. The lower two-thirds of the lungs were hazy and infiltrated with fine fibrous lines, and over the left base there was a considerable area of fairly heavy mottling.

This patient was put on complete rest for 5 months, during which he gained 30 pounds. At this time (4 years after becoming incapacitated) he is working as night orderly in a tuberculosis sanatorium, but his cough and dyspnea show no improvement. X-ray films show no clearing of the condition. He suffers at rather frequent intervals with chest pains, and about 3 months ago had an attack of fibrinous pleurisy with a rise of temperature to 102°.

Case II—C.A.B., white male, age 73 years. Patient appeared at clinic June 13, 1931, with cough and distressing dyspnea; had lost a few pounds, and had the appearance of a very ill man. He had worked practically continuously in the card-room of an asbestos plant for 8 years, but had been compelled to quit work about 6 weeks before on account of extreme weakness and shortness of breath.

The paroxysms of dyspnea, even on the slightest exertion, were severe. Talking apparently required considerable effort. Expansion was much deficient over the whole chest, the intercostal spaces being drawn inward on inspiration. Resonance was impaired over the lower two-thirds of both lungs, and the expiration was prolonged and roughened from the apex to base on both sides. There were dry and moist râles anteriorly from the 3rd ribs downward and posteriorly on both sides from apex to base. The breath sounds were considerably diminished over both lower lobes posteriorly.

X-ray films present a fairly typical picture of asbestosis. The right costo-phrenic angle is obliterated and the right leaf of the diaphragm is irregular in outline and peaked by adhesions. The left costo-phrenic angle is partially obliterated. The lung fields present the ground glass appearance. Around both hili are numerous apparently heavily calcified areas, and there are several such small areas scattered through the parenchyma of the lung. Stereoscopic examination of the films shows a fibrotic involvement of both lungs which is much more extensive over the lower lobes. In both bases there are fairly extensive areas of heavy mottling.

This patient, 2 years after the condition was first recognized, is still living, but his symptoms have in no way improved, and he remains totally incapacitated. The eventual fatal result by progressive cardiac failure appears to be inevitable.

Case III—R.G.J., white male, age 31 years, was admitted into the sanatorium on April 21, 1930, with a diagnosis of pulmonary tuberculosis. His complaints were lassitude, loss of weight, and cough, which symptoms had been gradually growing worse for 1 year. He had lost about 30 pounds, and, on account of weakness and shortness of breath, had been compelled to quit his work about 4 weeks before. His daily temperature, he stated, had not exceeded 100° F. He had worked in the card-room of an asbestos mill, in which there were some protective devices, for about 4 years.

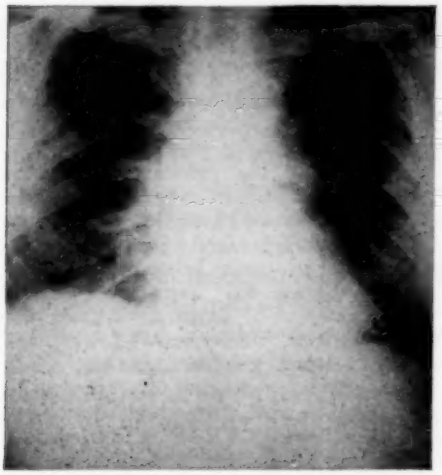

FIGURE I. CASE 1 Pulmonary Asbestosis
Roentgenogram, June 13, 1931

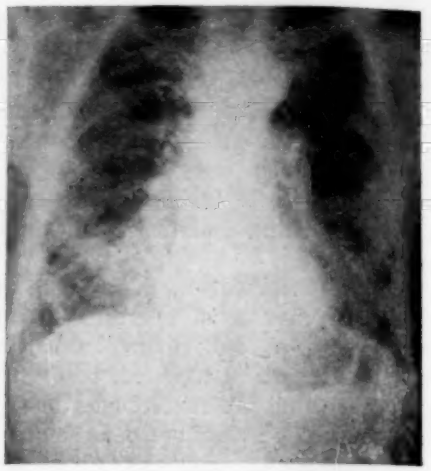

FIGURE II. CASE 2 Pulmonary Asbestosis
Roentgenogram, June 13, 1931

FIGURE III. CASE 3(A) Pulmonary Asbestosis
Roentgenogram, April 23, 1930

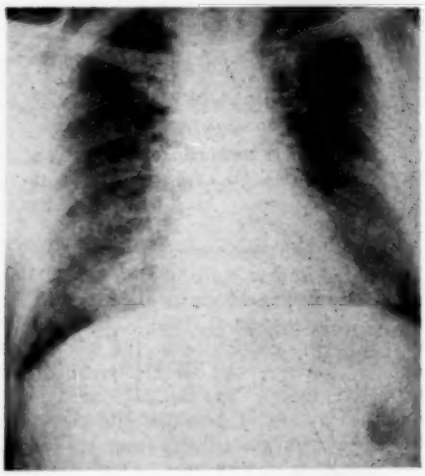

FIGURE IV. CASE 3 Pulmonary Asbestosis
Roentgenogram, September 2, 1931

The man was thin (weight, 127 lbs.) and his skin sallow. The clavicles were prominent and there was poor expansion over the whole chest. The resonance was impaired over both lower lobes; expiration was prolonged and roughened over the mid-portion of the lungs anteriorly, and from the 3rd to the 9th dorsal spines posteriorly. There were moist râles on the left side anteriorly from the 2nd to the 4th ribs, and posteriorly on both sides from the 4th to the 9th dorsal spines. The breath sounds were much diminished over the bases. The sputum was negative for tubercle bacilli. No asbestosis bodies were found in the sputum.

X-ray films taken March 23, 1930, show both costo-phrenic angles partially obliterated. The heart outline is somewhat shaggy, and there is much thickening around the hili. Throughout both lung fields is a snow-flake mottled density, which is much heavier on the right from the 5th to the 8th ribs anteriorly.

This patient was kept in the sanatorium for about 13 months, during which time his appetite and digestion improved considerably and he gained 38 pounds. His temperature, never over 100° F., become normal after about 6 weeks' rest and remained so until his discharge. His cough improved considerably, but at discharge he was still troubled with dyspnea. X-ray films of his lungs taken Sept. 2, 1931, 15 months after the first films, show an increase in the characteristic fine fibrosis. This is particularly noticeable over the right base over the area which showed in the first

films as a heavier shadow. The heart is more shaggy in outline, the diaphragm is flattened on both sides, and there is apparently increased retraction of the lower ribs. Although the patient appeared to have remained in good physical condition, the X-ray films indicate some increase in pathology. This man is still living, but remains incapable of continuing remunerative employment for any length of time.

These cases are typical of the condition found in each patient of the series, and, from the symptoms and X-ray findings, it seems justifiable to assume that the exposure to asbestos dust is the cause of their total and permanent disability. That exposure to the inhalation of this dust for even a comparatively short time is a definite and serious industrial hazard, has been too frequently indicated to be open to doubt. The fact that the condition when once acquired is permanent and more or less rapidly progressive is most important from a public health viewpoint. It also seems to be the consensus of opinion, not only among writers on the subject, but also among the asbestos workers, that the protective devices now in use in many plants are most inadequate.

The compensation laws in North Carolina do not list this disability as entitling the worker to proper remuneration, and I presume that legal status obtains in other states. In England, in 1931, the Asbestos Industry Regulations were made legally mandatory. These Regulations require the substitution of wet methods for dry, the enclosure of dust producing machines, the substitution of enclosed mechanical methods for hand conveyance and for dusty hand work generally, and the installing of exhaust drafts at dust producing points. In the same year it was also made obligatory for workmen in asbestos plants to appear for periodic medical examinations as a means of preventing or arresting the development of asbestosis.

If any similar regulations have been adopted in this country I am not familiar with them. Asbestos factories produce various necessary and valuable articles of commerce, and are, consequently, important parts of our industrial system. For that reason, if for no other, the workers should be provided with every facility for the protection of their health, so that they may earn a livelihood for themselves and families, for at least an average period of time, at the occupation in which they are most skilled. Unfortunately, every worker handicapped by pulmonary asbestosis becomes almost invariably physically incapable of engaging in *any* occupation, and many of them become an added expense to the welfare agencies of the community. Although the number of asbestos workers is much less than that in many other industries, their occupation is extremely hazardous, and they are amply justified in expecting whatever protection it is possible to give them. Furthermore, the fact that efficient protective devices in this industry, in spite of the added expense, will effect a substantial financial saving, is becoming more apparent. The workers themselves are becoming informed of the danger to health, and many civil suits for damages against factory owners are the result.

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Has Diabetes Become More Prevalent?*

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PRACTICALLY all the textbooks on the practice of medicine published 60 or 70 years ago speak of diabetes as a rare disease, and more common among men than women. At present every physician encounters cases of diabetes, and the disease is known to be very common. Mortality statistics generally show a marked increase in the registered mortality rate of diabetes during the past 50 or 60 years, an increase which has been especially great among women. Do these facts indicate that diabetes has really become increasingly prevalent? This is not an academic question. If the disease has really become more prevalent we should seek for the causative factors with a view to combating any which are preventable.

Prior to the middle of the last century the presence of sugar in the urine was detected (a) by the sweet, honey-like taste of the urine, and (b) by the formation of sugar crystals when a drop of urine was allowed to evaporate on a glass slide. No wonder that one of the older authors speaks of the repugnance which physicians had for testing the urine by taste. Trommer's qualitative chemical test for sugar was introduced in 1842, and Fehling's quantitative test in 1848. A careful study of the medical histories of New York Hospital indicates that even 30 to 40 years after these simple tests were available, no routine tests for sugar were made of the urine of medical patients. Not until some time between 1880 and 1890 was this present-day routine procedure introduced in this leading hospital. Undoubtedly the general practitioner lagged far behind. The conclusion is justified that diabetes was not recognized because it was not suspected, and because routine tests of the urine for sugar were not made. The textbook teaching that diabetes was a rare disease fostered this neglect to look for diabetes.

MORE COMMON AMONG MALES?

A considerable proportion of cases of diabetes has been discovered accidentally as the result of urine tests made in connection with life insurance. Data collected by the writer show that during the past 30 years the proportion of women examined for life insurance has trebled. Moreover the total number of policy holders, both male and female, has increased enormously during this period. The entrance of a large army of women into industry and the extension of industrial medical services have also increased the proportion of women whose urine has been tested for sugar. There is no convincing evidence that 40 or 50 years ago diabetes was really less prevalent among women than men. It is more reasonable to believe it was merely detected less frequently.

SIGNIFICANCE OF THE INCREASING REGISTERED MORTALITY

Because of the preference given to

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diabetes in the classification of deaths due to joint causes, the increasing mention of diabetes on the death certificates (due, in turn, to an increasing recognition of the disease) has resulted in a rapidly mounting death rate charged to diabetes. Much of this increase is fictitious, for many of the deaths represent merely the death of a diabetic individual from some other cause. With a further increased recognition of cases of diabetes, the registered mortality may be expected to rise still higher so long as this statistical practice continues, and this, in spite of the fact that through better treatment, deaths truly chargeable to diabetes decline in frequency. Mortality statistics of diabetes must therefore be used with the greatest caution and with an appreciation of their marked limitations.

OUR AGING POPULATION

Since diabetes develops most commonly after middle life, the aging of our population (because of the declining birth rate and the cessation of immigration) has a marked influence in increasing the prevalence of diabetes. In New York City the proportion of persons over 45 years of age in the population has increased approximately one-third during the past 30 years.

In New York City another factor has led to an increased prevalence of diabetes; namely, the relative increase in the Jewish population. In 1900 this group was about 17 per cent of the city's population; in 1930 it was approximately 30 per cent. Studies by Weiner, of the Department of Health, indicate that diabetes is considerably more prevalent among Jews than non-Jews.

PREVALENCE OF DIABETES

Diabetes is much more prevalent than is generally believed, but inasmuch as the disease is not reportable, no figures are thus far available. The writer has undertaken to determine the incidence of diabetes in New York City by means of sampling, using for this purpose the results of urine examinations of patients admitted to the state hospitals for the insane, from the New York Metropolitan area. The compilation must, of course, be made by age and sex. Life insurance statistics as well as incidence studies from general hospitals are open to the objection that the individuals represent selected groups. A large body of statistical material from state hospitals for the insane seems best adapted to throw light on the prevalence of diabetes, and it is therefore recommended that health officers throughout the country collect such information from these institutions.

The writer believes that, aside from the increased prevalence of diabetes due to the aging of the population, an increase which must be accepted as real, (and in New York City also the increase due to the larger proportion of Jews in the population), diabetes was probably about as prevalent 50 years ago as it is now. He feels that the increase, during the past 30 or 40 years, in the diabetes mortality in the various age groups finds an adequate explanation in the more frequent recognition of the disease in recent years. In this connection one should remember the attention drawn to diabetes by the work of Allen, and especially by the discovery of insulin by Banting and Best in 1921.

OVEREATING OF SUGAR AND OTHER FACTORS

If it be accepted that, apart from the effect produced by the aging of the population, diabetes really has not become more prevalent during the past 50 years, it will be clear that we should not charge the rising diabetes mortality rate to the increased per capita consumption of sugar, or to some other alteration in our diet, or to some marked change in the relation between

our expenditure of physical energy and our food intake. All of these alleged factors have their advocates. Certainly it would be difficult to explain why these factors should affect the mortality rate of females exclusively, for when due allowance is made for the age factor, the increase is limited to diabetes deaths in females.

One of the chief problems facing health administrators is the difficulty of dealing with the diseases of later life. Because of the amenability of diabetes to treatment and the experience of physicians in prolonging the lives of their diabetic patients, the wider recognition and the proper treatment of cases of diabetes will help to increase the expectancy of life in the higher age groups.

School Medical Inspection in Madrid

THE introduction of medical inspection in the public elementary schools of Madrid as a beginning of a nation-wide system was ordered in a decree of June 5, 1933.

The decree prescribes the appointment, following a competitive examination, or 34 physicians and 23 nurses; some of these physicians and nurses will make the physical examinations of the children in the schools; the rest will constitute the staff of a dispensary for school children which will be established in Madrid.

All the physicians in the school medical inspection service will constitute a technical board. This board is to make studies and prepare reports at the order of the Minister of Public Education and to suggest necessary measures.

The work will be under the supervision of a chief medical inspector appointed by the Minister of Public Education, who will also be the chairman of the technical board. Graduate courses will be established for the physicians who are to serve as school medical inspectors when such inspection is introduced in the other cities of Spain. Detailed regulations for the functioning of this system will be issued at a later date.—*Gaceta de Madrid,* June 7, 1933.

Significance of Copper and Iron in Blood Restoration*

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DURING the past few years much attention has been given to the iron and copper content of foods and to iron and copper preparations used for blood restoration. It is logical for us to ask, what is the practical significance of these studies? and how much consideration must we give to the supply of these elements in our diet?

Before discussing the justification of the blood regeneration claims accorded iron and copper, it is important to point out that these elements are concerned only with hemoglobin formation. They have little to do with other blood constituents; even the red blood cells are only indirectly affected by these metals.[1] For example, in secondary or hypochromic anemia the body is unable to form sufficient hemoglobin, and the corpuscles decrease because they have no pigment to carry. When the amount of hemoglobin increases, the number of cells returns to normal providing there is no deficiency in the cell forming mechanism. In pernicious anemia the decrease in the cell count is the primary change, and the hemoglobin content decreases because there is an insufficient supply of cells to carry the hemoglobin. The mechanism of hemoglobin formation is not impaired in this form of anemia. We must keep in mind then that the supply of iron and copper affects only the hemoglobin content of the blood and that the other changes observed are indirectly dependent upon the quantitative changes in the amount of pigment.

We must also remember that iron and copper are equally essential for hemoglobin formation although the quantitative requirement of each element may differ to a large extent. Since iron is a constituent of the molecule and copper acts only in a catalytic capacity, it is easy to see why more iron than copper is needed. I do not believe it is necessary at this time to discuss any of the divergent opinions which have been held concerning the specificity of copper. The necessity of copper as a supplement to iron has been demonstrated in so many different laboratories and with so many different animals that there can be no question about the requirement of copper for all red-blooded animals. It is also possible to refer to a number of clinical reports which demonstrate the necessity of copper for humans.

Copper cannot take the place of iron nor can it compensate for unavailable forms of iron. Copper functions only in the production of hemoglobin from the iron after it is assimilated.[2] Absorption and retention of iron and the conversion of iron into hemoglobin are two separate mechanisms. Studies on the availability of iron, therefore, should not be neglected because copper has been associated with hemoglobin synthesis. In order that active hemoglobin formation can take place the body must

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contain definite quantities of both iron and copper. The actual amount which must be supplied in our diet each day to maintain a normal blood stream depends upon the rate of hemoglobin formation and the storage of the elements in the body. In rapidly growing infants there is a great demand due to the continual production of new blood. During the early suckling period this demand is satisfied almost entirely by the iron and copper present in the liver at birth, because the milk diet furnishes only small amounts of these elements. The supply in the liver is soon exhausted and unless additional sources of these elements are included in the diet anemia develops. Spectrographic analyses of livers from children, recently reported by Ramage, Sheldon and Sheldon,[3] show that the iron and copper content of the liver falls rapidly during the nursing period and increases when a mixed diet is taken.

During the past 5 years we have studied the hemoglobin content of the blood of approximately 1,000 children brought to the child health centers in Madison.[4] The results clearly demonstrate two facts: First, severe anemia is encountered in very few cases. It is only when all modern methods of infant feeding are completely disregarded and a diet of milk alone continued for 5 to 6 months that exceedingly low hemoglobin readings are obtained. Second, a slight anemia is found to be present in a large percentage of well fed children. At present I am unable to make any statement concerning the seriousness of these subnormal values. However, Miss Mackay[5] has reported similar results for children in London and has correlated the prevalence of children's diseases with a low hemoglobin content of the blood. Kato and Emery[6] also state that there must be some relation between the low hemoglobin content of the blood and the degree of resistance against invading microörganisms. During the past year we have studied the effect of supplying additional iron and copper to the diets of a number of the children brought to the clinics. The work is still in progress, but the results to date indicate that the addition of these metals causes a definite increase in the hemoglobin in a very large percentage of the cases. In infants 5 months to 1 year of age the values increase from 10 to 11 gm. up to 12 to 12.5 gm. per 100 c.c. of blood. The latter figure appears to be the maximum value for infants of this age and readings above 12.5 gm. are seldom encountered even after feeding relatively large amounts of iron and copper. The maximum level increases with age, reaching values of 14 to 15 gm. when the individual is about 15 years of age. Thus, growing children are not only required to produce sufficient hemoglobin to supply the increasing blood volume but also to compensate for the increase in the normal hemoglobin content of the blood. I know of no comprehensive studies on the prevalence of anemia in children between the ages of 5 and 15 years, but from my meager experience with blood studies on college students I would not be surprised to find that many young adults have subnormal hemoglobin values.

Recent studies by Minot and Heath,[7] Dameshek,[8] and others have shown that hypochromic anemias are much more prevalent in adults than is generally supposed. In many of these cases the deficiency is due to an abnormality in the gastrointestinal tract preventing the proper utilization of iron. Even in cases of pernicious anemia treated with purified liver extract, the body's capacity for hemoglobin production may not be sufficient to allow a maximum rate of blood regeneration.

This short discussion of the demands for hemoglobin production clearly indicates that an anemia of low color index may be present, and is present to a

lesser or greater extent, in a large number of individuals. What is the best way to insure an adequate supply of iron and copper, which are known to be essential for hemoglobin production? If we are interested only in the simplest and cheapest method, there is no better way than to add simple iron and copper salts to our diet. We now have ample proof that inorganic salts can serve as the sole source of iron and copper.

In the laboratory[9] rats have been raised from birth to maturity on cow's milk supplemented with iron and copper salts, together with a small amount of manganese, which is also needed to make milk complete. Second and third generation rats have been produced on this diet. Farm animals such as pigs and calves have been reared successfully on mineralized milk. During the past summer I had two students who lived on mineralized milk for 6 weeks. They consumed between 3 and 4 quarts of milk daily together with the proper quantities of iron, copper, and manganese. The only other food which they ate was one orange a day. The boys remained in excellent health and an actual increase in the hemoglobin content of the blood was observed during the experimental period. This not only demonstrates the completeness of a diet of mineralized milk, but it also shows that humans can rely on inorganic forms of iron and copper for hemoglobin production. Thus the entire iron requirement of one individual can be supplied at the cost of a few pennies per year, and the copper requirement can be satisfied for about one-tenth of one cent. Can we ask for a simpler method of insuring hemoglobin production? This does not mean that the entire problem of hemoglobin formation has been solved. I have said nothing about the organic precursors of the blood pigment, but from a practical point of view it is sufficient to state that milk supplies these requirements. There is also much to be learned about the best forms and amounts of salts to be supplied. This can only be determined by long clinical experience.

In spite of the availability of such cheap forms of iron and copper most of us are not going to obtain our supply in this form. The fact is human beings have obtained their supply from foods for thousands of years before we knew these elements existed, and humans who are unaware that they need such metals will continue to obtain iron and copper from ordinary foods. However, if we are to rely upon foods alone for the maintenance of a normal blood stream we must know the limitations of each type of food and the methods of eliminating these deficiencies. The deficiency of milk in blood forming elements is universally recognized today and means are generally taken to compensate for the deficiency. In choosing foods to supplement those low in iron and copper we have used the total iron and copper content as the basis of our choice. In the case of iron we now know that this is not justifiable. We used to think that all food iron was readily available and utilizable. This is far from true. Food materials contain varying amounts of hematin iron and this form of iron cannot be assimilated. One mg. of iron supplied by wheat is not nearly as valuable as one mg. of iron supplied by a simple salt. The unavailability of a good share of the iron in many of the foods used in infant dietaries probably explains the prevalence of subnormal hemoglobin values observed in the children we have studied. Experimental work which we have conducted with rats during the past year[10] clearly indicates that diets of milk and cereals or cereal products are decidedly deficient in blood forming elements. These diets are more deficient in iron than copper,

and a fair rate of hemoglobin regeneration was obtained by the addition of iron alone.

The maintenance of an optimum level of hemoglobin in rapidly growing infants is only possible if the demands on the liver iron and copper are reduced to a minimum by the early inclusion in the diet of foods rich in these elements. If an infant is born with a reduced supply, or if the supply is used up during the first few weeks of life, it is very difficult to reëstablish a high level with food alone. The hemoglobin value can be increased to the optimum level in most children by supplying a small but definite amount of iron salts. I am of the opinion that a large number of children would benefit by the treatment. This does not mean that all children who do not receive this treatment would be severely anemic, but it would insure an optimum hemoglobin level which may be of great value in combating certain diseases.

The availability of the copper in different foods has not been studied. From a practical point of view this question may not be as important as the availability of iron because the requirement for copper is less and many foods which make up the bulk of our diet are relatively rich in copper. In many cases the hemoglobin building power may be restored to normal by the addition of iron alone, but until we are certain of an ample supply of available copper I feel it is wise to supply a small but definite amount of copper along with the iron.

So far I have discussed only the maintenance of a normal blood stream or the restoration of the blood when there is only a slight decrease in hemoglobin. When it becomes necessary to treat anemias with very low hemoglobin values, even foods considered to be rich in iron cannot supply enough to allow rapid regeneration. A number of workers have found iron salts to be superior to liver for the treatment of these anemias. Iron salts are now used extensively for the treatment of hypochromic anemias. The question at present seems to be whether copper should be supplied. In these cases the demand for iron is so great that the requirement for copper may seem insignificant. It is also possible that the diet supplies the needed amount, but unless you can be certain of this fact the copper should be added. Dameshek [8] Mills,[11] Josephs,[12] and others have reported a number of cases which did not show a maximum response to iron until copper was added. If hemoglobin formation is actually retarded in some cases by a deficiency of copper, then the supply in many others must be close to the border line. This does not mean that we should recommend a wholesale use of copper salts, but that we should use standardized iron and copper preparations whenever there is a danger of copper deficiency.

In conclusion, we may say that diversified diets supply sufficient iron and copper for the maintenance of a normal blood stream in adults with normal hemoglobin requirements. For rapidly growing children and for adults with increased hemoglobin demands, many diets may be low in iron and possibly copper. The value of foods for supplementing diets low in iron and copper must be based upon the amount of available elements, not upon the total content. Diets deficient in blood forming elements may be rendered complete by addition of standardized quantities of iron and copper salts.

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Child Labor Law of May, 1933, Egypt

A CHILD labor law of May 3, 1933, establishes a minimum age of 12 years for employment in factories, workshops, mines, and quarries, and in construction and transportation work. It does not apply to agriculture nor to home work in which only the members of the family are employed. However, children between the ages of 9 and 12 years may be employed in spinning, weaving, and knitting establishments and in other work "compatible with their age and physical ability." This provision is similar to a provision in a law of 1909 and in an order of 1931.

The new law limits the working day for children from 9 to 12 years of age to a maximum of 7 hours, exclusive of rest periods amounting to 1 hour. However, the law provides for the first time that in the case of children attending elementary schools the total hours of work, added to class hours, must not exceed 7. For children between 12 and 15 years a maximum day of 9 hours is prescribed, exclusive of rest periods amounting to 1 hour. Children below the age of 15 years may not be employed between 9 p.m. and 5 a.m.; they must also be given a weekly rest of at least 24 consecutive hours.

The new law prohibits the employment of children below the age of 17 years in certain specified occupations, and of children below the age of 15 years in certain other occupations without a certificate from the public health officer as to their physical ability to perform the work. No person below the age of 17 may be employed without an identification card giving his name and age and bearing his photograph. The law is to be enforced by inspectors. Penalties are prescribed for violations.—*Journal Officiel du Gouvernement Egyptien, June* 26, 1933.

EDITORIAL SECTION

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THE DEPRESSION AND HEALTH APPROPRIATIONS

TO ascertain the extent to which the present economic depression has affected the appropriations available to public health departments in the United States, questionnaires were recently sent out to the health officers of the 48 states and of the 108 largest cities in the country.[1] Replies were received from 36 states, aggregating a population of over 89,000,000 or approximately 71 per cent of the total population of Continental United States, and from 62 cities whose populations totaled 24,241,000, or about 61 per cent of the total population of the 108 cities questioned. It is believed that the results of the analysis of the data supplied by these health departments are fairly representative of conditions throughout the United States today.

In keeping with the general tendency to curtail expenditures in all governmental departments, there has occurred a sharp reduction of public health budgets. These reductions do not seem to have exceeded those connected with other governmental functions. Nevertheless, in view of the fact that appropriations for health conservation in most states and cities never have been adequate even in the best of times, it is felt that the continuation of the present tendency might jeopardize much of the progress made during the past two decades.

Of the 36 states which supplied the required data, 29 showed reductions in 1933 over 1931, ranging from 77 per cent in North Dakota to less than 3 per cent in Montana. Fifty-six cities reported similar reductions ranging from 47 per cent in Canton, Ohio, to 2 per cent in Richmond, Va. Seven states and 5 cities reported increases in public health budgets during this period, but for the most part, these were slight. One city, Nashville, Tenn., showed no change since 1931. The average reduction in the 29 states and 56 cities which reported reduced health budgets was about 17 per cent, slightly less in the states and a little more in the cities.

These figures represent net reductions between the appropriations of 1933 and the expenditures of 1931. In some cases, a small increase in one year was offset by a greater decrease in another year. However, there were 13 states and 44 cities which showed reductions in both years. Among these states, the total reduction since 1931 averaged 26.5 per cent; among the cities, 18 per cent.

Significant as are these figures, they nevertheless fail to portray the true gravity of the situation. Appropriations in 1933 cannot properly be compared with expenditures in 1931, for the reason that in many of the states and cities, 1933 revenues are almost certain to fall short of those anticipated; in which case, appropriations for health work will have to be scaled still further to enable these communities to maintain balanced budgets.

General figures, such as have been cited, however, cannot show how serious conditions are in certain sections of the country. For example, North Dakota in 1933 reduced its appropriation for health work from $38,819 expended in 1931, to $9,032 in 1933, a reduction of nearly 77 per cent; Mississippi showed a decrease from $526,394 in 1931 to $130,000 in 1933, about 75 per cent; Alabama, reduced from $677,110 to $436,954, or nearly 36 per cent; Virginia, from $606,700 to $404,215, or exactly one-third; and Ohio's health budget declined from $323,273 to $229,820, or 29 per cent.

Among the cities, the largest reduction occurred in Canton, Ohio, where the 1931 budget of $40,527 was reduced to $21,690 in 1933, or nearly 47 per cent; in Seattle, Wash., the health appropriation fell from $667,202 to $410,653, 39 per cent; in Birmingham, Ala., it decreased from $98,591 to $61,370, 38 per cent; and in each of the cities of Peoria, Ill., Flint, Mich., and New Haven, Conn., the reductions amounted to over 36 per cent.

In certain of these communities, the reductions represent principally cuts in salaries which have been absorbed by the staffs but in many cases they have also necessitated curtailment of essential activities and the scaling of personnel to mere skeleton organizations.

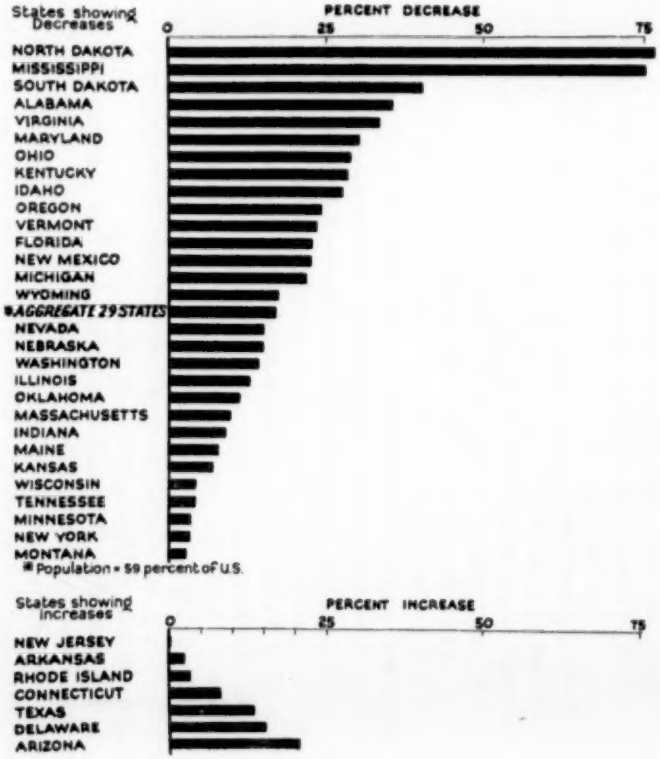
Hundreds of physicians, nurses, inspectors, clerks, and others specially trained in the technic and routines of public health work have been dropped. We have been most fortunate in that we have not had to contend with any serious epidemics during the past 3 years. If such an epidemic should occur as swept the country in 1918, it is not difficult to imagine the serious consequences which might follow with health departments in their present depleted conditions.

The worst feature of the situation is that many of the largest reductions have occurred in those communities which apparently have been the least able to stand them, considering the low per capita expenditures for health work in these places during past years. The cities and states which had good organizations have apparently learned the value of their investment in health work and have made only moderate reductions in their appropriations.

A further matter for concern is the fact that most of the private agencies interested in public health work, such as hospitals, clinics, public health nursing associations, etc., have suffered even larger cuts in their budgets than have been enumerated above respecting public agencies.

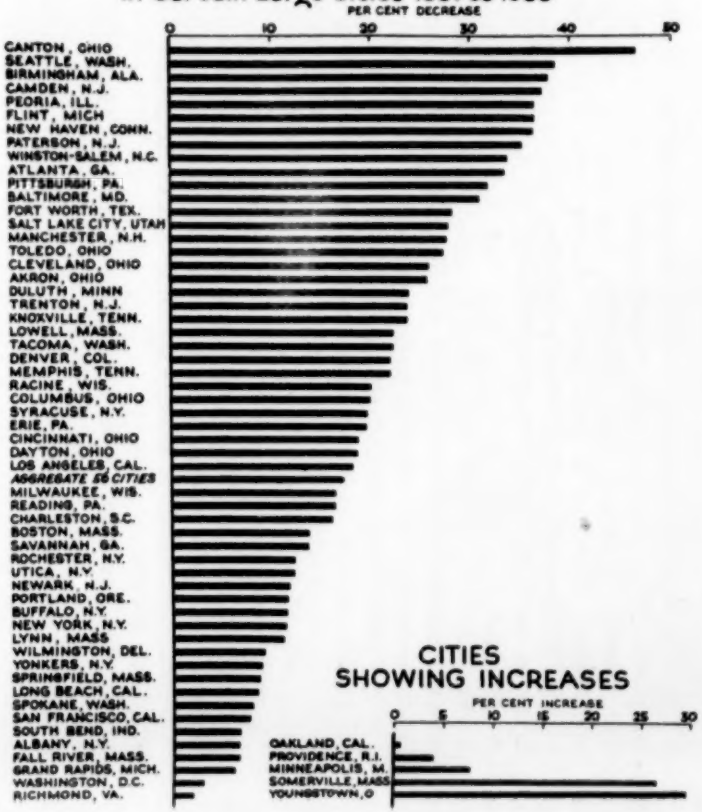
In view of all this, it is astonishing that the general health of the country has been maintained in such excellent state during the past 4 years. It is, perhaps, for this very reason that there has been such general inclination to reduce health expenditures during this period. We must not allow ourselves to be lulled by such seeming security. Undoubtedly, the present favorable state of public health is

REDUCTION IN HEALTH DEPARTMENT BUDGETS
In Certain States 1931 to 1933



* Population = 59 percent of U.S.

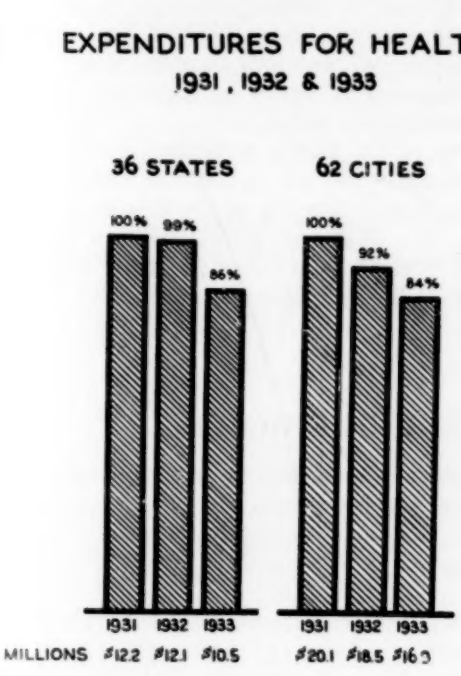
REDUCTION IN HEALTH DEPARTMENT BUDGETS
In Certain Large Cities 1931 to 1933



very largely due to the momentum obtained in the past. Any appreciable let-up in our efforts would probably result in serious consequences.

In view of the present situation, it is recommended that the Association use all of the channels of publicity open to it to obtain the ear of the American people, and especially of those in authority, in order to stem the tide of further curtailment of health budgets. The Association must emphasize the fact that at the present time per capita health expenditures are in the aggregate running pretty close to $.70 per annum; that such amounts are insufficient for adequate service, that at the first moment when economic conditions permit, the per capita health expenditure should be raised at least to the level of $1 which prevailed in 1930; and that, thereafter, the communities should be encouraged to raise their budgetary allowances so that ultimately the standard declared by the Association to be essential, namely, $2 per capita, may be realized. It is further recommended that in the interval the Federal Government be urged to take note of the situation of the local and state health services and make available through relief or other special appropriations such amounts as will help maintain health departments in good working order.

Finally, it is recommended that the Association coöperate in every way possible with other national organizations interested in public welfare, and further the campaign to maintain the health work of private agencies at their previous levels. At the present time, the reduction of appropriations for public health work has thrown enormous burdens on such private organizations as visiting nurse organizations, child health stations, tuberculosis clinics, etc. These organizations merit public support more than ever before. The community chests and other agencies engaged in the collection of funds for the support of these associations should receive the backing of health officers and other members of the American Public Health Association.



1. Report of the Committee on Stabilization of Health Appropriations (Louis I. Dublin, Ph.D., *Chairman*) of the American Public Health Association presented to the Governing Council at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

DOCTOR PARK NOT TO RETIRE

THE report current in New York City last month that Dr. Park would be retired from his position in the city health department on reaching the age limit, 70, in December attracted attention throughout the country. The leading newspapers in New York discussed the matter in their editorial columns and urged that steps be taken to secure Dr. Park's retention. Letters to the editor were

published praising Dr. Park's services and protesting against his retirement. A petition was circulated asking the Board of Estimate, in whose hands the matter lies, to continue Dr. Park in service.

An inquiry directed to the Department of Health discloses the fact that the law requires the retirement of all civil service employees when they have reached the age of 70. In order, however, not to lose employees whose services are still valuable to the city, the Board of Estimate is empowered to continue such persons in service after formal application for such continuance has been made. Dr. Park has not yet filed his application, though it is understood he is willing to continue in service and will comply with this necessary formality. On the part of the Department of Health there is no willingness to let so valuable a scientist as Dr. Park leave the service and when Dr. Park's application is forwarded it will, we are told, carry the strongest possible endorsement from Health Commissioner Wynne.

Inasmuch as all such applications must be acted on by the Board of Estimate, made up of the Mayor, the Comptroller, the President of the Board of Aldermen and the five Borough Presidents, no one is in a position to announce in advance what action will be taken. In the case of Dr. Park's application there is no reason to doubt that the Board will be heartily in favor of retaining Dr. Park in service. Because of the wide interest aroused by the matter, Mayor O'Brien has written to Dr. Park expressing the hope that Dr. Park will continue to give the city the benefit of his services. The Mayor has also assured him of hearty support when the formal application comes before the Board of Estimate.

It is gratifying to learn that the rumors of Dr. Park's retirement are baseless and that public health workers throughout the world are to continue reaping the benefits of the splendid work done under Park's direction in the laboratories of the New York City Department of Health. With so many important health problems demanding solution by laboratory methods, we can ill afford losing a man of Park's outstanding ability. We hope he will continue to aid us for many years to come.

AMEBIC DYSENTERY IN CHICAGO

AT the recent meeting of our Association in Indianapolis, a paper was read, which on account of its importance has been published elsewhere,[1] since it seemed advisable to get this before the public more promptly than was possible in a monthly journal. There is also a special article [2] and an editorial [3] on the same subject.

Briefly, the facts are that during the summer an outbreak of amebic dysentery occurred in Chicago, and up to date, there have been 185 cases, with 19 deaths and 193 carriers of Endameba histolytica. The infection was traced to one of the prominent hotels which employed some 364 food handlers, among whom there were found 15 active cases and 11 carriers. A disquieting feature is that two food handlers who were discovered in the 1927 outbreak [4] were also among those involved in the present flare-up. In 1929, 148 food handlers were examined, among whom 27 carriers and 2 acute cases were found.[5] Some groups were especially hard hit. Of a committee which met in Chicago in June, 6 members developed colitis and 4 of them died. Three of these deaths have been proved to have been due to amebic dysentery. It is also stated that Texas Guinan, who died in the

West on a theatrical tour, was also a victim of this disease. The figures given prove conclusively that amebiasis was widely spread among the food handlers of this particular hotel. An attempt is being made to find out, through a questionnaire to 22,000 guests of the hotel chiefly concerned, approximately how many visitors to the Chicago Fair have been infected. Of 3,490 replies returned, 180 reported illnesses, of which 69 were diagnosed as amebic dysentery and 23 suspected of having the disease.

The lesson from this outbreak is clear; namely, the compulsory examination of all food handlers before employment and careful supervision of them afterwards. This is a difficult task, as food handlers are rather a migratory type, and especially at times when a city is crowded with visitors, as Chicago was during the World's Fair, large numbers of outside workers are apt to come in who later return to their homes. It is advised that those who have a history of amebiasis should be examined repeatedly for at least 4 months, and thereafter every 6 months for the rest of their lives.

Physicians and health officers throughout the country should be on their guard. The diagnosis of amebic dysentery can be made certainly only by a well equipped laboratory such as will be found in all of our cities and states. There is no doubt that amebiasis has been too prevalent throughout the United States, but with such a source of infection as has existed in Chicago with its millions of visitors during the past summer, fresh infections and further spread of the condition is inevitable, so that double precautions as to early diagnosis and increased vigilance for cases and carriers should be maintained in every state and city.

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SENATE BILL NO. 1944

A BILL to prevent the manufacture, shipment and sale of adulterated or misbranded food, drugs, and cosmetics, and to regulate traffic therein; to prevent false advertisement of food, drugs, and cosmetics; and for other purposes.

Of this bill Dr. P. B. Dunbar of the U. S. Food and Drug Administration says:

President Roosevelt has ordered a complete revision of Doctor Wiley's famous "pure food law." The proposed new law, which retains all the worthy features of the Wiley act, modernized to meet present-day conditions, has already been introduced into Congress by Senator Royal S. Copeland of New York. It is identified as Senate Bill 1944 and will presumably come up for action early in the next session.

Dr. Wiley's pure food law provided protection to the consumer against food adulteration and misbranding. It covered conditions as they existed in 1906, and in spite of violent opposition at the time of its enactment has come to be accepted and appreciated today by the honest members of the very industries which it regulated. Times have changed and with the years the unscrupulous have

found ways of transferring matter from label to other means of consumer appeal. Cosmetics have come into a use totally unsuspected in 1906, and the present food and drug law has no control whatever over these products unless the manufacturer makes sufficient medical claims to permit their classification as drugs. As a result of all these changes there is today need for amending and enlarging the scope of the old law if consumer protection is to be maintained. There is need for more definite penalties and provision for methods of presenting evidence against the fraudulent if the enforcement officials are to be supported in their enforcement of public protection.

In brief, then, there is general recognition of need for change in the food and drug act and sympathy with the objectives of the present movement.

The question of support or opposition to Senate Bill 1944 is, however, more than a matter of sympathy with or opposition to the objectives of the protectors of consumer health. The bill states not only the objectives but the methods for attaining them. One may sympathize with objective and oppose the published method, and such opposition has been steadily developing since the industry and the public have had opportunity to study the wording of Bill 1944.

We do not regard this bill as an emergency measure in the sense of the measures that have been enacted to make business recovery and maintenance of homes and earning possible. It need not be "rushed" through Congress. Furthermore, the country's experience with the 18th amendment should be such as to counsel caution that a measure designed for the public welfare be one that will enlist the mental and moral support of the citizens concerned after enactment.

We appreciate that the only way to bring about a reform is to set up a plan of action. This has been done in the wording of Bill 1944. Given such a basis for further action, let every one in the American Public Health Association see to it that his representative in Congress knows his desire for the reforms suggested; but also let him know that we hold him responsible for a proper method of enforcement and for modification of the present wording wherever necessary to prevent its jeopardizing the very objectives sought.

In brief, we are for a revision of the present Food and Drugs Act to allow it to embrace control of cosmetics and of all media for presenting information about foods, drugs, and cosmetics to the public. We believe in giving our enforcement officials better tools for functioning. But we wish a law that will accomplish these ends, one that will be the true expression of what the consumer wants and needs. We solicit support for a bill but we ask that the bill be carefully framed even though to do so would necessitate extended conference and radical change in the phrasing of Bill 1944.

PASADENA IN 1934

THE Governing Council of the American Public Health Association has elected to hold the1934 annual meeting in Pasadena, Calif.

At first blush, this seems a rash procedure, traveling appropriations being what they are for public health workers. The immediate reaction of many eastern members will be to settle back now and decide to miss attendance in 1934 in the hope that 1935 will bring the organization again within an overnight ride from their homes.

The philosophy back of the decision to go to the west coast next year may be briefly stated. The Association is a national society. It is just as far from the Pacific Ocean to the Atlantic as it is from the Atlantic to the Pacific. The far western members have not been taken into consideration by the national body since 1918; yet every year thereafter the registration records have shown representation from western states. It is fitting and proper now for eastern public health workers to reciprocate this support and travel to Pasadena in the fall of 1934 to join with the Western Branch in the celebration of its fifth anniversary.

The Committee on Meetings and Publications reminds the Association members that attendance at the Annual Meeting of their Association should not be dependent upon the ability of their organizations to finance their travel. Many of the most important figures in the public health world who have attended meetings consecutively for many years have never received a penny from any source toward their expenses. They have dug into their own pockets without question for the privilege and pleasure of attending the one national meeting that is strictly the possession of the public health profession.

It is the obligation of the Association this year to bring to Pasadena for the benefit of its western members the same excellent scientific program that has been arranged in recent years, with a cast of headliners, and the same distinguished audience. To this end every member of the Association who has attended Annual Meetings in the past can contribute, and the Association expects the support of its membership.

The Pasadena meeting is 10 months away. Travel to the west coast next fall will be less expensive than ever before. The most advantageous arrangements will be made by the Committee on Meetings and Publications. If special party fares will bring the cost per person down, special trains will be set up at convenient points. To members who know now that their departments and institutions cannot afford to send them to Pasadena the suggestion is made that they employ a method similar to the Christmas Clubs and Vacation Clubs so universally used by banks everywhere for the accumulation of small weekly sums, to provide a travel fund that will assure their presence at Pasadena for what should be and can be the most colorful, enjoyable, and profitable gathering of public health workers ever held.

ASSOCIATION NEWS

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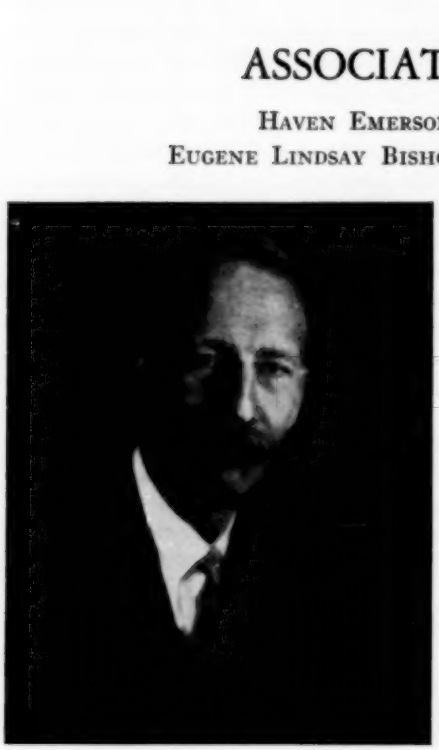
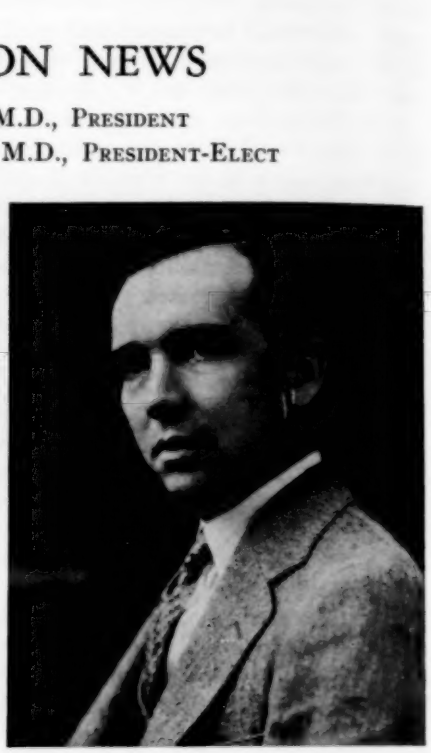


Haven Emerson, M.D.
President, A.P.H.A.



Eugene Lindsay Bishop, M.D.
President-Elect, A.P.H.A.

FOR the past year the office of President of the American Public Health Association has been filled by John A. Ferrell, M.D., Director of the International Health Board of the Rockefeller Foundation. At the Indianapolis Annual Meeting, Haven Emerson, M.D., President-Elect, became President. Dr. Emerson has been a member of the Association since 1914, was a Charter Fellow, and is also a Life Member.

DR. BISHOP, President-elect, is a native of Davidson County, Tenn. He is a graduate of Vanderbilt University School of Medicine, 1914, and received his C.P.H. from Johns Hopkins School of Hygiene and Public Health in 1923.

He was field director of Tennessee State Health Department 1916–1918; director, division of rural sanitation 1918–1922; Assistant Commissioner of Health 1923–1924; and since 1924 Commissioner and Assistant Professor of Preventive Medicine at Vanderbilt University School of Medicine.

He is a Fellow of the American Public Health Association; member of Committee on Administrative Practice, and Chairman of Sub-Committee on Rural Health Work; served for past 2 years as Chairman of Executive Board and a member of the Governing Council; was Secretary, and later Chairman, of the Health Officers Section. He was instrumental in the organization of the Southern Branch of the Association and

was elected President at its initial meeting in 1932.

Dr. Bishop was formerly a member of the Board of Scientific Directors of the Rockefeller Foundation, and is at present Chairman of the Committee on Federal Relations of the State and Provincial Health Officers and Committee on Standards of Qualifications for Local Health Officers of State and Territorial Health Officers.

He is a member of the Tennessee State Medical Association; Nashville Academy of Medicine; American Medical Association (formerly Secretary, and later Chairman, Section on Preventive and Industrial Medicine of this Association); Southern Medical Association; National Malaria Committee (Chairman 1932); American Society for the Advancement of Science; American Social Hygiene Association; American Child Health Association. Member Alpha Omega Alpha, Alpha Kappa Kappa, and Delta Omega honorary fraternities.

SECTION RESOLUTIONS

ADOPTED AT THE INDIANAPOLIS ANNUAL MEETING

Vital Statistics

DEATH OF EDWIN W. KOPF

RESOLVED, that in the passing of Edwin W. Kopf, Charter Fellow of the American Public Health Association, the Section on Vital Statistics recognizes the loss of an honored member and acknowledged leader, who contributed invaluable services to the statistical study of mortality and morbidity. Mr. Kopf's ability and energy, together with his intellectual honesty and keen critical faculty in interpreting statistical data were qualities which not only inspired the admiration and confidence of his coworkers in the American Public Health Association, but which earned recognition abroad; and be it further

RESOLVED, that the Secretary be instructed to extend to his widow, Anna Belle Kopf, this expression of the high regard in which the members of the Vital Statistics Section of the American Public Health Association held Mr. Kopf's lovable character and fine scholarship; and be it further

RESOLVED, that in behalf of the Section, the Secretary be instructed to extend to Mrs. Kopf its deepest sympathy in her irreparable loss.

COMPLETION OF REGISTRATION AREA

The Section on Vital Statistics of the American Public Health Association recognizes with gratification that the Registration Areas for births and deaths have now become co-extensive with the continental area of the United States. This achievement is the culmination of 50 years of effort initiated by Dr. John Shaw Billings; ably continued by Drs. William A. King, Cressey L. Wilbur, and William H. Davis; and brought to a successful culmination by the present incumbent, Dr. Timothy H. Murphy, therefore be it

RESOLVED that the Section on Vital Statistics offer its congratulations to the Bureau of the Census, that Vital Statistics, the foundation of sound public health activity, have finally been placed upon a nation-wide basis, and be it further resolved that the Section expresses its appreciation to the agencies and individuals who have made this achievement possible.

COÖPERATION INVITED FROM UTAH

WHEREAS, the Registration Areas of the United States for births and deaths have now been completed, making

possible for the first time the publication of vital statistics on a nation-wide basis, and

WHEREAS, the complete realization of this objective is now made impossible only by the absence of returns from the State of Utah from January 1, 1932, to date, be it

RESOLVED, that the Section on Vital Statistics of the American Public Health Association appeal to the Honorable Henry H. Blood, Governor of the State of Utah, for coöperation with the other 47 states of the Union, in the prompt transmission of certificates of births and deaths to the Bureau of the Census.

PUNCH CARDS VERSUS TRANSCRIPTS

WHEREAS, definite decision has been made by the Bureau of the Census to accept punch cards from the New York State Health Department in lieu of transcripts of death certificates, and

WHEREAS, this action is, in effect, acceptance by the Bureau of the Census, for inclusion in its annual mortality reports, of the classification of certified causes of death by the New York State Health Department instead of by the Bureau of the Census, and

WHEREAS, the New York State Health Department (Division of Vital Statistics) is, for the present, in the unique position of having in charge of this important branch of its work the very man who, over a long period of years, had the same responsibility in the Bureau of the Census, and

WHEREAS, the New York State Health Department thus enjoys an advantage which should enable it so to classify the causes of death that the resulting death rates for the individual causes of death should closely approximate those which would result if the classifying were done in the Bureau of the Census. Now, therefore, be it

RESOLVED, that in view of the unique position of the New York State Department of Health, as hereinbefore noted, *and for that reason alone*, it is the sense of the Vital Statistics Section of the American Public Health Association that acceptance of that state's coding of the causes of death will not materially affect the comparability of New York State death rates with those published in Census Mortality volumes in the past, and be it further

RESOLVED, that it is also the sense of this Section that state health departments, in general, do not have the trained personnels requisite for this work; and that years of training would be required to bring them up to the standard of efficiency which obtains in the Bureau of the Census, and be it further

RESOLVED, that it also is the sense of this Section that the extension to other states of the practice of accepting punch cards would constitute a dangerous threat to the integrity of statistics of the individual causes of death, unless it be found practicable to have the editing staffs of the states work under the direct and continuous supervision of trained Bureau of the Census coders for a period of years.

LABORATORY LETTERS OF INTEREST

THE Laboratory Section archives were enriched during the Indianapolis meetings when Professor E. O. Jordan, one of the organizers of the Section although now—because of changing interests—a member of the Epidemiology Section, furnished the Section with three letters written to him in 1899 by Dr. Wyatt Johnston of Montreal, Que., pertaining to the formation of what was then called the

Laboratory Committee of the American Public Health Association but which became the Laboratory Section. By vote of the Section Council these letters were read before the well attended luncheon session of the Section on Wednesday, and greatly interested all present. A motion was made by Dr. Lillian South of Louisville, Ky., and seconded by Dr. G. F. Reddish of St. Louis, Mo., that the originals of these letters be preserved among the section records and that a letter of thanks be sent to Dr. Jordan for his courtesy and thoughtfulness in furnishing these documents to the Section.

One letter is typewritten and signed by Dr. Johnston, requesting Dr. Jordan to become a member of the "Laboratory Committee." It mentions that Professor Welch of Johns Hopkins has consented to act as honorary chairman, and urges that Dr. Jordan's studies on the effects of the drainage canal be a motive for a preliminary communication at the meeting in Minneapolis in November, 1899. Dr. Johnston interestingly promises if the presentation is made to "see as far as possible that any men from St. Louis who wish to take part leave their revolvers outside and employ as far as possible parliamentary language." The second is a circular letter, but signed by Dr. Johnston, requesting applications for membership and titles of papers for the first meeting. The third is a letter in Dr. Johnston's handwriting thanking Dr. Jordan for his contribution in advance of the meeting.

Several of those who heard the letters read expressed interest that the object of the formation of the Laboratory Committee, as expressed then by Dr. Johnston was "to unite the sanitary laboratory men in the Continent in some manner which will secure us the means of discussions coöperative of research, etc., besides a communication of our individual results."

The hope was expressed that others who have interesting old documents in their possession will be prompted by Dr. Jordan's action to submit them to the secretaries of any sections concerned.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

Antonio Luis de Barros Barreto, M.D., D.P.H., Caixa Postal 251, Bahia, Brazil, S. A., Health Officer, Federal Department of Public Health (Associate)

Wedford W. Brown, M.D., City Hall, Athens, Ga., Commissioner of Health, Athens and Clark Counties

Fratis L. Duff, B.S., Department of Public Health, Lawton, Okla., Health Officer

Daniel V. O'Leary, M.D., 315 Delaware Ave., Albany, N. Y., Health Officer

Laboratory Section

Lewellyn S. Dibble, B.S., 78 Nilan St., Hartford, Conn., Director of Laboratory, Bryant and Chapman Company

Renwick H. Leitch, M.A., Dairy Research Labs., Auchincruive Ayr, Scotland, Professor of Dairying, West of Scotland Agr. College (Associate)

Victoria Orner, B.S., 111 N. Monroe St., Sturgis, Mich. (Associate)

William A. Starin, Ph.D., Dept. of Bacteriology, Ohio State University, Columbus, O., Professor of Bacteriology

William M. Stockwell, M.D., Cedarcrest Sanatorium, Hartford, Conn., Supt. and Medical Director

Public Health Engineering Section

H. B. Foote, State Board of Health, Helena, Mont., Engineer

James P. Myers, B.E., 29 Frank St., Preston,

Victoria, Aust., Swimming Pool Manager (Associate)

A. D. Sloane, 64 Main St., Perry, N. Y., Sales Manager, Kaustine Co., Inc. (Associate)

Food and Nutrition Section

Henry T. Scott. Ph.D., Univ. of Wisconsin Alumni Research Foundation, Director of Biological Research

Child Hygiene Section

Ina Gerritt, B.S., 114 E. Glenwood, Fullerton, Calif., Teacher of Hygiene, Fullerton High School

Public Health Education Section

Nellie G. Loftus, R.N., 25 N. Loveland Ave., Wilkes-Barre, Pa., Supervisor G-U Clinic No. 1, State Department of Health

I. Franklin Miller, P.O. Box 133, Pittsburgh, Pa. (Associate)

Willa Murray, B.A., 1343 H St., N. W., Washington, D. C., Assistant to Director, National Committee on Federal Legislation for Birth Control

Public Health Nursing Section

Beatrice I. Hamel, R.N., 335 Huntington Ave., Suite 32, Boston, Mass., City Public Health Nurse.

Esther M. Latimer, R.N., 26½ E. Main, Danville, Ill., Supervisor, Child Welfare Assn.

Charlotte E. McGee, R.N., P.H.N., 1623 Appleton St., Long Beach, Calif., Public Health Nurse, Tuberculosis Assn.

LETTER TO THE EDITOR

TO THE EDITOR:

In the October, 1933, issue of the *American Journal of Public Health* appeared a letter to the Editor from G. M. Mackenzie, M.D. suggesting that the laboratory "standards" used in *Community Health Organization* are too low, and also that "contacts and the correlation of the clinical aspects of public health work and laboratory diagnosis can be achieved far more successfully if the director of the laboratory is a graduate in medicine." Before publication, Dr. Mackenzie courteously sent me a copy of this letter, but circumstances prevented a reply until now. Such communications are welcomed because of the value of exchange of viewpoints in the line of progress.

Although the "Estimates" or so-called "Standards" given are not those of the editor, but of the Sub-Committee on Appraisal of Municipal Health Work of the Committee on Administrative Practice of the American Public Health Association, the following comments are offered. It has been a guiding principle of the Appraisal Committee to set standards not beyond the attainment of all cities but at a point which is actually reached by a quarter of the cities. They are not "ideal" or "maximum," and perhaps for some cities not even "adequate" standards. They are, however, practical working standards proved by experience to be well within the range of attainment. The standards used in *Community Health Organization* were based on the 1929 edition of the *City Appraisal Form,* and these standards were in turn based on the actual experience in cities immediately prior to this.

The laboratory section of the *Appraisal Form,* during the 1929 revision, was submitted to a committee appointed by the Chairman of the Laboratory Section of the A.P.H.A. and the members gave much consideration to the items, and recommended revisions which were incorporated. The "specimen" was adopted as the unit in place of the somewhat indefinite term (with varying interpretations) "examination." Specimen was defined as "similar material submitted to a laboratory in a single container from a single source. A note attached to the item "6,000 examinations per 100,000 population" read: "The grand total of specimens and ad-

ditional reported results. Credit will be granted only for work actually done in *local laboratory maintained by the community.*"

Laboratory service has increased since 1929 and the new edition of the *Appraisal Form* (1934) will undoubtedly recognize this fact. From such data as are available, it would appear that the services now rendered in New York State, as shown in Dr. Mackenzie's table, are greater than throughout the country generally. Thus it is probable that even with the raising of standards in accordance with increased service generally, the actual standards set in the new *Appraisal Form,* in accordance with the principle of adjusting them to the point which is exceeded by the upper quartile of cities, will still not be as high as some of the figures given by Dr. Mackenzie.

Relative to the need for a graduate in medicine as a laboratory director, conditions vary. The degree is far less important than the ability, personality, and training of the individual in charge. Considering practical problems throughout the country, it is my belief that cases are rare where a medical director of a public health laboratory is needed in a city of 200,000 population or less, The medical degree may be an asset but rarely an essential if the laboratory director has sufficient medical contacts to comprehend the significance of his work. There are many cities and counties, and even some states, where the public health laboratory is efficiently directed by a non-medical person and where the physicians regard highly the laboratory service.

Very truly yours,
IRA V. HISCOCK

Members and Fellows of the A.P.H.A.

WHY PAY ANNUAL DUES?

IF you dislike the bother of paying membership or Fellowship dues each year, or

IF you are one of those absent-minded people who have to be reminded again and again of unpaid dues, or

IF you are thrifty, *then you should apply for*

LIFE MEMBERSHIP *in the* A.P.H.A.

Write to the Committee on Fellowship and Membership of the American Public Health Association for information regarding this form of membership.

PUBLIC HEALTH ADMINISTRATION

Milbank Memorial Fund — The twenty-eighth year of the Fund's activities was characterized by somewhat increased emphasis on the larger aspects of public health and social welfare.

The Fund's previous experience in health demonstrations and in conducting or aiding in various experimental public health and related projects has strengthened its belief that public health, as a social function, is concerned not only with direct measures for the prevention of disease and the education of the public in hygiene, but also with the medical care of the sick, the proper administration of relief, and with the prevention of all conditions that are harmful to health, whether they be economic, social, or more directly etiological. In this course, the Fund has been aided by the wise advice of its various boards of counsel and by the coöperation of a number of voluntary and official agencies, local, state, national, and international.

In connection with the Bellevue-Yorkville demonstration in New York, many of the services developed within the area have been extended to other parts of the metropolitan district; the policy of district health administration through health centers has been adopted, and a program of district or decentralized health administration has been decided upon. The Fund has conducted studies aimed at finding out how existing public health procedures can be made more effective through increased efficiency of personnel and by more careful selection of individuals.

Coöperation is being given the U. S. Public Health Service in a consideration of the health problems of adult life; in a scrutiny of public health procedures, especially in nursing, maternal, infant, and child hygiene, tuberculosis and communicable disease control, and in the treatment of syphilis. Support is also extended to the International Health Organizations of the League of Nations in a study of the effect of the depression on health. Among the research studies in which coöperation is being given are the extent to which birth control is practised in families of different economic and social class and the effectiveness of different methods; the coöperation on syphilis research with the medical schools of The Johns Hopkins University, Western Reserve University, University of Pennsylvania, University of Michigan, and the Mayo Clinic; in the maintenance of a school of nursing in the Syracuse University Medical School; in research on rheumatic fever in the Yale University School of Medicine.

The Fund is financing and technically assisting a unique and noteworthy public health experiment in a typical rural area of China, which is being conducted under nonpolitical auspices, and is coördinated with the agricultural, industrial, and educational program of the Chinese National Association for the Mass Education Movement. Technical assistance was given to the President's Research Committee on Social Trends in the preparation of that committee's notable report, and financial aid was given to various health, social welfare, and educational projects of such organizations as the New York Academy of Medicine, the Association for Improving the Condition of the Poor, the Henry Street Settlement, the East Harlem Nursing and Health Service, and the Judson Health Center.

Kanawha County, W. Va.—The seventh annual report of the county health unit for the year ending June 30, 1933, emphasizes the value of artificial immunization against diphtheria, smallpox, and typhoid. Most of the phy-

sicians in the county, especially those on contract with coal companies, do most of the immunizing in their communities. Many of the coal companies accepted the recommendation of the health unit to require that anyone moving into their houses submit to artificial immunization of all members of their families unless previously protected. During the year there were given 8,366 immunizing treatments against typhoid, 5,677 against diphtheria, and 4,059 against smallpox. There was no smallpox during this period. The county employs a physician to attend to the medical care of prisoners, inmates of the county infirmary, and indigent cases.

Public health education is stressed, and the health unit is supported in this program by the school authorities, the Women's Clubs, the 4-H clubs, insurance companies, and milk companies, as well as by the medical profession. The disaster committee of the American Red Cross gave special assistance in flood relief work.

Syracuse, N. Y.—The year 1932 marked the 100th anniversary of the formation of the board of health for the community which later became known as Syracuse. In the U. S. Chamber of Commerce Health Contest, Syracuse shared honors for first place in 1932 with New Haven in the population class. At the medical dispensary, over one-fourth of the 81,000 visits were made by persons applying for medical aid for the first time, and since 1929 the number of dispensary cases has increased 40 per cent. In addition, the 6 physicians employed by the Department of Health to make home calls upon the indigent sick, during the year, made 12,000 such visits, or over twice the number made in 1931, and nearly four times the number made in 1930. Outbreaks of measles and whooping cough required 21,963 home calls by nurses in contrast with 8,281 in 1931. In prenatal clinics, over 1,000 new cases were registered—or double the 1929 enrollment. The known cases of tuberculosis numbered 1,529 as compared with 1,445 in 1931.

In spite of these increases, economic circumstances caused the closing of one tuberculosis clinic with a reduction of weekly sessions from 8 to 5; and the reduction of child welfare clinic sessions by over 100 for the year. Other important personnel cuts, including the bureau of health education, are noted. The staff was reduced from 153 persons in 1931 to 129 in 1932, with a budget reduction of approximately $50,000. The *esprit de corps* of the employees is praised and reference is made to volunteer assistance. Services were rendered by the welfare division of the Federation of Women's Clubs in well baby clinics, by the Junior League at the medical dispensary, by Mothers' Clubs, and by the Onondaga Health Association in promoting health educational activities, as well as by the Public Health Committee of the Syracuse Academy of Medicine.

Among other worth while experiences which have so far come out of the depression adjustment service should be mentioned the real advantages of the consolidation of infant and preschool clinic services, as well as the consolidation of the food and sanitary inspection services. On the other hand, half-time nursing service cannot be called a success and should be corrected as soon as possible. A proposal advanced during the early part of the year to permit the sale of raw milk directly by the farmer was definitely vetoed. In fact, an amendment of the sanitary code, prohibiting the sale of any raw milk other than certified, was the final outcome which left the Bureau of Food Inspection in a stronger position.

Montclair, N. J.—In 1932 this city of 44,572 population expended through its health department $1.12 per capita. Of the total deaths, 56 per cent occurred among persons 60 years of age or older, 16 per cent being 80 years of age or over. There were 124 deaths from dis-

eases of the circulatory system, 47 from cancer, and 31 from tuberculosis. The low infant mortality rate of 38 is noteworthy.

A physical examination was made of each school pupil, including eyes, ears, teeth, tonsils, chest, heart, posture, and general mental aptitude. Each student was also weighed and measured. Children with physical defects were followed up and more coöperation than previously was enlisted from the family dentist and physician. Physical examinations were also made of 980 food handlers.

During the year, 2,000 families received some form of public health nursing service in their homes. This represented some 5,000 individuals with a total of 32,956 nursing visits or an average of 13 visits per day per nurse. There were 10,137 clinic visits of various kinds. The nursing service includes all follow-up work from the prenatal and post-partum clinics and ward maternity cases of the hospital. The nursing bureau also investigated all calls coming to the Department of Public Welfare for physicians.

> Standing orders have been received from the town physician for patients under his care, which are carried out by the nurses, and many times eliminates the necessity for a call from him thereby decreasing the cost of medical care.

National Society for the Prevention of Blindness—Progress in the program designed to eliminate the principal diseases causing blindness and to reduce eye injuries to a minimum is shown in the Society's Annual Report, entitled "Twenty-Five Years of Saving Sight." The report discloses a growth of membership from the 10 public-spirited men and women who organized the Society a quarter-century ago to 16,600 members throughout the United States; it discloses, also, that activities have been extended, in collaboration with the medical profession, the field of education, organized labor, the safety movement, social work, governmental agencies, and other groups. The report says:

> Throughout the past year the National Society for the Prevention of Blindness has had evidence that the economic crisis will have its effect on the eyesight of the future. The Society believes it has reached a high level of accomplishment in a depression year, when every economy was required. The organized movement began in 1908 as a campaign in New York State against blindness from ophthalmia neonatorum. It evolved into a nation-wide movement in 1915 when the New York State Committee for the Prevention of Blindness became a national committee. As a result of adoption of laws, in most states, requiring doctors, nurses, or others in attendance to put prophylactic drops in the eyes of babies at birth, and the constant educational activities of the Society, the frequency of ophthalmia neonatorum as a cause of blindness among children admitted to schools for the blind has diminished each year until now it is approximately 75 per cent less than in 1908. Complete eradication of this source of blindness—once the most prolific of all causes—is regarded as scientifically possible.

Another aspect of the movement is the work of "sight-saving classes" for the education of partially-seeing school children. In these classes, children with seriously defective vision are provided with books in large type, good lighting and specially trained teachers; the children are given an opportunity to receive an education and vocational guidance, while their remaining vision is conserved. The number of classes has increased from the 2 established in 1913—one in Boston and one in Cleveland—to 421 now maintained in 121 cities throughout the United States. Despite the depression, 15 new sight-saving classes were established in 1932; the most recent being one planned for Waikiki, Hawaii. The report points out, however, that

> . . . there are still 45,000 children in the United States who have such seriously defective vision that they cannot receive their education in the regular classes, but should be in sight-saving classes.

In its campaign against the eye hazards of industry, the Society coöperates with state labor departments, industrial journals, insurance companies, trade associations, universities and vocational schools, safety engineers, and others professionally concerned with industrial accident and health problems. During the past year the Society sought, particularly, to arouse the public against dangerous fireworks and toy firearms, which constitute serious hazards to children. A survey conducted by the Society revealed that many children lost their sight as the result of accidents while playing with such toys.

Some communities have laws regulating the sale of fireworks, but there is great laxity throughout the country in enforcing these laws. The Society has secured the coöperation of governors, mayors, local safety councils, and influential citizens, generally, in its effort to stamp out this menace to childhood. While legislation is necessary, the major responsibility rests with parents and teachers. The publication of *Eye Accidents in Child Play* crystallized sentiment on this subject and resulted in additional and more stringent laws in some cities.

The report points out that special clinics have been established in New York, Philadelphia, and Cincinnati for cross-eyed children whose parents cannot afford the long and expensive treatment under the care of a private physician.

While it may be too soon to forecast the success of the work being done in these centers, it is hoped that it will prove an added accomplishment in the program of saving sight. It seems almost inexcusable that there should be any children left with cross-eyes, when we realize that it is an affliction which usually can be corrected early in life. "The cross-eyed child is frequently a behavior problem because he is self-conscious and suffers from a sense of inferiority. Unfortunately, it is popularly believed that cross-eyes can be outgrown. Parents often neglect to have the defect in their children's eyes corrected until too late to avoid the physical or psychic involvements. The Society is striving to inform parents, through popular literature, lectures, and the newspapers, of the urgency of early treatment for the young cross-eyed child."

Ministry of Health, England—Annual reports of the chief Medical Officer of the Ministry of Health of England abound in information and stimulating discussions of much value to health administrators. The 1932 document is no exception to this rule. The statistical tabulations are models of completeness and accuracy.

During the last 40 years of the 19th century, infant mortality in England and Wales was almost stationary, but in the present century it has been reduced by more than half. The decline is greatest at 3–6 months and least in the first month of life. The most important decline in recent years was in bronchitis and pneumonia and in diarrhea and enteritis.

Speaking generally, the infant mortality rate is highest in the county boroughs and in the north of England, and the decline has been greatest in the small towns and in London.

A table shows the deaths recorded by individual years since 1900, the number which would have been recorded, had the rate of mortality observed over 1901–1910 still prevailed, and the difference. Hence, in 1932, in this area of 39,988,000 people, there were 39,933 infant deaths, with 38,655 less deaths than if the earlier rate had prevailed.

It cannot, I think, be doubted that this is to a large extent due to increased maternal care of the new-born child. There has, of course, been an improvement in the external environment of the child, sanitary, social, and domestic; but after all is said about the influence of external improvements, it has to be remembered that the "environment" of an infant under 12 months of age is mainly its mother. . . . With a declining birth rate it may be said, that it is imperative that the nation should save the newly-born if it is to sustain the population; but on the con-

trary, it may also be held that it is futile to save these lives unless they be properly reared and equipped for healthy and productive citizenship. Merely to save life, or merely to prolong it, is not enough.

In discussing the question of unemployment and national health, the author notes that any long sustained physical pressure or stress of serious degree represents itself ultimately in a rise in mortality, particular or general. He emphasizes the importance of observing the secular, or century, trend in physical evolution of a race and the need to cultivate a historical sense. Of two facts, he says, we may be sure. First, there is taking place a great improvement in the physical condition and health of the people—life is longer and its physical character is better than in former centuries in England. Second, he indicates that "We possess, for better or worse, a more sensitive humanitarianism for human pain and distress than formerly, and fuller means of expressing it."

Reference is made to the health insurance service in which 16,000 doctors are at the medical service of 16 million persons over 16 years of age, with cash benefit, medical and disablement benefit, and a series of additional benefits for dentistry, nursing, etc. Where, by failure to pay contributions due to unemployment, these persons may cease to be entitled to the insurance medical benefit, they can, in their need, have recourse to the public assistance medical service which is to a large extent rendered by the same medical practitioners as serve on the panel. Some 8 millions receive such benefit every year.

Though unemployment itself seems to be an unmixed evil, it must not be forgotten that in innumerable instances the unemployed person has more fresh air, exercise, rest, and freedom from industrial risks and restrictions than fall to his lot when he is employed. Again, the community, as compared with pre-war years, has realized the health and economic advantages of increased sobriety. Lastly, there is the ever-spreading practice of personal hygiene in dietary, clothing, exercise, cleanliness, and an open air life, which is rendering an immeasurable profit in life and health to the population as a whole.

Baltimore, Md.—In the 118th annual report of the Department of Health, 1932, the departmental organization is set up in three sections—administrative, medical (including nursing and dental), and sanitary. Vital statistics, public health education, and health district work are included under administration. There are 13 consultants to the department, this board having been appointed in 1932. An air view of Baltimore and the eastern health district adds interest and serves to orient the reader in considering the new district development. The district comprises the 6th and 7th wards, and includes a population of some 60,000 people, of whom 21 per cent are colored and 13 per cent are foreign born. Other accomplishments of the year included the completion of a health and hospital survey by the U. S. Public Health Service, the establishment of a satisfactory relationship with the public health committee of the city medical society, and the clarification and extension of several important services.

The health of the city, as reflected in statistics, was good in comparison with other years. A general death rate of 13.1 and an infant mortality rate of 62 were new low records. In the field of public health education, notable progress was made. The *Baltimore Health News*, issued monthly, reached some 8,875 readers. There was inaugurated a permanent radio health service. Negro Health Week was featured. The coöperation of 50 motion picture houses was enlisted to show during the diphtheria prevention campaign a trailer which was viewed by a half million people. There were also shown 35 other motion pictures to audiences totalling nearly 12,000. Demonstrations, exhibits, round-table

discussions, and a health contest were included in the program. Some 724 newspaper articles were prepared (6,771 column-inches devoted to public health), and 815,086 pieces of health literature were distributed to 89,540 persons.

The health district project, first proposed in 1921 by Dr. William H. Welch, was launched during the year. Cooperating with the health department and the School of Hygiene were several voluntary health agencies including the Babies' Milk Fund Association and the Instructive Visiting Nurse Association.

Among the purposes of the development are: The furnishing of facilities for the systematic training of health officers, public health nurses and other workers who might be employed by official or nonofficial agencies conducting public health activities in the city, of pupil nurses in hospital training, and of students of public health; as well as the making available of a field for more precise and instructive study of numerous public health problems, both administrative and epidemiological.

Canadian National Committee for Mental Hygiene—The report of a survey made of this organization in 1932 by the Canadian Medical Association reveals in an enlightening manner the stages of development, and the extent of present services, and provides recommendations for future guidance of committee work. Caution is expressed to prevent the work from becoming too diffuse, and it is suggested that the National Committee study public health services in Canada, particularly as they apply to municipalities and counties, with a view to the inclusion of mental hygiene in public health and the raising of standards of official health services.

The National Committee needs to determine its program for mental hygiene as part of public health, and, at the same time, to consider the standards of public health service, for it can be expected that mental hygiene will be effective in public health in proportion to the effectiveness of the whole, this in turn being dependent upon the standard of public administration established.

The report contains a detailed plan, or proposed organization, for the future which divides the work into 8 divisions and provides for four permanent committees, including education, research, service, and public administration. The first of 16 specific recommendations urges that the committee promote the training of mental hygiene leaders, and undergraduate instruction for professional workers; and that they give particular consideration to instruction to undergraduates in medicine, to nurses and teachers in training, and to physicians and nurses who are preparing for public health work.

Suffolk County, N. Y.—In the fourth annual report of this county department of health, reference is made to the supervision of 450 boarding homes, requiring the full time of an inspector who makes quarterly inspections in accordance with law. These homes bring an income to their operators of some $125,000 a year. There were also 29 licenses refused during the year. Maternity homes are likewise supervised and licensed.

Sanitation receives much attention in the county, including sanitary surveys of private wells, public water supplies, Huntington Harbor and Lake Ronkonkoma. Public health nurses are assigned to townships for generalized services, although bedside nursing is done only in case of emergency or for demonstration. The health department budget for the year ending October 31, 1933, was $86,000 for a population of 166,205 (1931). An infant mortality rate of 50, a birth rate of 15.4, and a death rate of 16 are recorded for the year 1931, including institution figures.

LABORATORY

RAPID AGGLUTINATION TECHNIC APPLIED TO *B. PERTUSSIS* AGGLUTINATION

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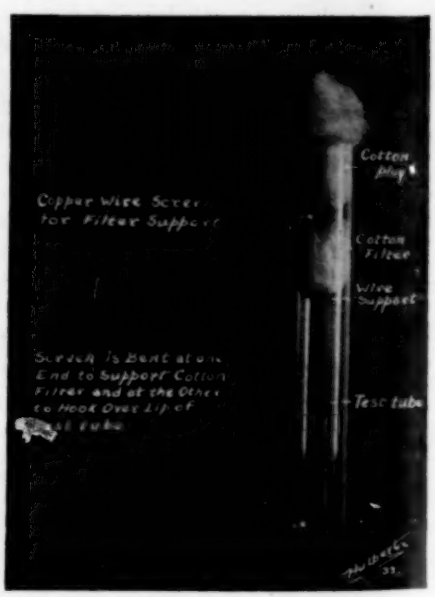
WHEN first using the agglutination reaction in testing cultures of *B. pertussis*, the usual technic was employed. Five tenths c.c. of each serum dilution was mixed with 0.5 c.c. of culture suspension and the mixtures incubated at 55° C. for 4 to 5 hours and then placed at room temperature. Readings were made at the intervals selected by Leslie and Gardner [1]—at 4½ hours—and again after the tests had stood over night. Considerable difficulty was experienced in the interpretation of results because of the tendency of *B. pertussis* suspensions to settle out in a somewhat mucoid clump after standing for a time. Differentiation of this nonspecific factor from true agglutination was not always easy and end-points were indefinite. It seemed possible that the rapid agglutination technic devised by Miss Noble [2] might overcome the difficulty since the readings would be made before the suspensions had an opportunity to settle. Only a few series of tests were needed to demonstrate the superiority of the procedure, and it is now used exclusively in our study of *B. pertussis* agglutination. The details of the procedure follow:

Antigen—The 48-hour growth of *B. pertussis* on a Bordet-Gengou slant is transplanted to a half Petri plate of Bordet-Gengou medium. After 48 hours' incubation, the growth is removed with a stiff, bent needle and emulsified in 1½ c.c. of physiological salt solution. The suspension is filtered and adjusted, if necessary, to a turbidity of approximately 10 billion organisms per c.c. by comparison with a standard.

Filtration is an important step in obtaining satisfactory, smooth suspensions. Test tube filters are prepared for this purpose. A thin layer of moistened cotton is shaped around the finger, placed on a simple copper wire netting support, and inserted in a 5 by ⅝ tube, the free end of the wire strip being bent to hook over the lip of the tube. The cotton is molded against the walls of the tube by means of a wooden applicator. These filter tubes are



plugged with cotton and sterilized. The filter is easily removed after use and the plug reinserted. The accompanying photograph shows the filter support and the completed test tube filter.

For a larger filter, a layer of gauze and cotton is wrapped around the outside of a square of wire netting cut from a bias strip and shaped to fit inside the neck of the bottle or flask of the desired size. The filter is suspended by two wires which cross under it, pass through the netting, and are hooked over the lip of the flask.

Antiserum—For preparation of a diagnostic serum, a rabbit is injected intravenously with a 10 billion per c.c. suspension prepared from a 48-hour growth of a recently isolated *B. pertussis* culture to which merthiolate 1:10,000 has been added at least 24 hours previously. The injection doses are 0.4 c.c., 0.8 c.c., and 1.0 c.c., respectively, at 3- to 4-day intervals. About 1 week after the last injection, the agglutination titer (equivalent, as explained below) has been around 1:20,000 in the six different rabbits treated by this method. The serum dilutions for agglutination tests are chosen according to the particular conditions. For testing cultures isolated by the cough plate method, the dilutions usually employed are 1:10, 1:100, 1:500, 1:750, 1:1,000, 1:1,500, and 1:2,000. For uniformity, the same dilution scheme is always employed and separate pipettes are used for the different dilutions.

The agglutination test—One-tenth c.c. of each serum dilution is mixed with 0.1 c.c. of antigen, the measurements being made with one c.c. pipettes graduated in tenths. For an antigen control, 0.1 c.c. of saline is mixed with 0.1 c.c. of antigen. The mixtures are shaken by hand for 3 minutes. For the shaking process, the racks are rocked at the rate of approximately 60 back-and-forth motions per minute and in such a way that the contents flow up the walls of the tubes for about three-quarters of their length. After the shaking period, physiological salt solution is added for greater ease in reading. Because of its convenience, the Hipple pipetting apparatus, used in the Kahn test and set to deliver 0.5 c.c. of saline, is ordinarily employed.

Reading the tests—The tests are read immediately after the addition of saline and each tube recorded as —, ±, +, + +, + + + or + + + +, according to the degree of agglutination. In the interpretation of the results in comparison with those given by other workers, a question arises because the final dilutions in the rapid test are not strictly comparable with those ordinarily given. This is of small consequence, however, provided the method of expressing the results is clearly stated. In the 0.2 c.c. mixtures of the rapid test, the series of serum dilutions 1:10 to 1:2,000 would give a series of final dilutions from 1:20 to 1:4,000. Any particular final dilution in the usual 1 c.c. test would contain five times the actual quantity of serum and antigen contained in the same dilution of the 0.2 c.c. rapid test. Therefore, if based on the actual quantity of serum present in the mixture, the series of final dilutions 1:20 to 1:4,000 of the rapid test would be equivalent to a series 1:100 to 1:20,000 in the usual 1 c.c. test.

Experience with the method—This rapid agglutination technic has been used for *B. pertussis* agglutinations for about a year. Repeated tests have been made with more than 130 recently isolated cultures and with a variety of stock cultures. The method has been used also for testing various antisera for *B. pertussis* agglutinins. The results have been clear-cut and consistent. The data on the serology of recently isolated cultures given in another communication on the cough plate method by Kendrick and Eldering [3] are based on this rapid method.

SUMMARY

The rapid agglutination technic has proved far superior to the usual 1 c.c. test for *B. pertussis* agglutination. Most important of the advantages, the tests are completed before any difficulty arises from the nonspecific clumping effect observed in so many *B. pertussis* suspensions. The advantage of the rapidity with which the results are obtained is obvious. In addition, the agglutination reaction is more clear-cut and the end-points are more easily determined.

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VITAL STATISTICS

The Importance of Tuberculosis as a Cause of Death in the Various Age Groups in the Population of Michigan, 1932—In spite of the constantly decreasing tuberculosis mortality observable throughout the United States, this disease is still one of the most important causes of death. Its importance varies in the different age groups and according to sex.

In a study of the ten principal causes of death among persons between the ages of 1 and 60 years in the State of Michigan in 1932, some interesting facts come to light. Excluding the deaths among infants under 1 year of age, tuberculosis as a cause of death appears among the ten principal causes in each age group up to 60 years for both males and females.

In the age group from 1 to 4, tuberculosis is the fourth most important cause of death among females and the fifth most important among males. In the age group 5–9, it appears in fifth place for both males and females with the same number of deaths for each sex.

Starting with the age of 10 years and extending to the age of 45, tuberculosis becomes a much more important cause of death than in the ages under 10. For children between the ages of 10 and 14, tuberculosis among females takes first place and among males fourth place; then between 15 and 30 years it remains in first place for females and reaches second place for males. In the age period 15–19 years, this disease was responsible for 119 deaths among girls in Michigan in 1932 and for only 58 among boys. For girls, this number of deaths represents slightly more than 28 per cent of all the deaths in this age group; among the boys of this age, the number of tuberculosis deaths represents not quite 11 per cent of the total deaths.

From ages 30 to 35, it is the most important cause of death for both males and females. In the age group 35–40, tuberculosis becomes relatively less important among females than among males, being superseded among females by heart disease and cancer. Among males, however, it is the most important cause of death, being responsible for more than 15 per cent of the total deaths in this age group, as compared with 10.5 per cent among females of this age. In the age group 40–44, it remains at third place among females, and among males it is superseded only by heart disease. The number of tuberculosis deaths among males is more than twice the number among females, and represents 12 per cent of the total

deaths in this age group, while among females it represents only 8 per cent.

As middle age is reached, ages 45 to 49 years, the degenerative diseases become much more important, cancer and heart disease in particular. In this age group, tuberculosis among females has dropped to sixth in importance and among males to fourth. Owing to the higher mortality of males than of females above the age of 40, and to the greater importance of tuberculosis as a cause of death among males in the older age groups, it is reasonable that the number of deaths should be higher; but the fact that they are almost three times as numerous as among females is noteworthy. This discrepancy in the sex ratio of tuberculosis mortality is noticed also in the age group 50–54 years when tuberculosis claims fourth place in the causes of death among males as compared with seventh place among females. In the age group from 55 to 60 years it takes eighth place among females and seventh among males.—*Michigan Public Health.* 21:183–189 (Aug.), 1933; 21:208–212 (Sept.), 1933.

Infant Mortality in New Zealand in 1932—The most remarkable feature of the vital statistics of New Zealand for 1932 is undoubtedly the phenomenal drop in the already very low infant mortality rate. In 1930 this rate stood at 34.48 per 1,000 live births, a figure slightly in excess of that recorded for the previous year. The interrupted downward movement, however, was again resumed in 1931, and continued in 1932, when the rate fell to the unprecedentedly low level of 31.22 per 1,000 live births. This represents a decrease of 79 in the actual number of infants succumbing during the first year of life. During the last 5 years, the reduction in the total infant mortality rate has been due largely to the improvement in the male death rate, which has shown an uninterrupted decline. The female rate, which is much lower than the male, has fluctuated somewhat.

By a more intimate study of the infant mortality statistics, obtained by breaking up the first year of life into smaller divisions, the effect of the influences which have been operating in recent years toward the saving of infant life is made more obvious. The most encouraging aspect of this year's infant mortality rate is the further substantial reduction in the rate for under 1 month. Prior to 1931, the long succession of improvements effected in the total infant mortality rate has been almost entirely due to the diminution in the figures for infants who survive the first month of life. Deaths due to what may be termed prenatal influences generally occur during the first month, and it is this group which has hitherto been least amenable to the efforts made to cope with infant mortality. However, the last 2 years have completely changed the picture, as substantial improvements have taken place in almost every subdivision under 1 month, even down to those occurring during the first day of life.

The decrease in the number of infant deaths registered in 1932, as compared with 1931, has taken place principally in the group "diseases peculiar to early infancy," and as these are mostly of antenatal origin, it would appear that herein lies the explanation of the falling death rate for infants under 1 month of age.

Closely related with the question of infant mortality is the problem of the stillbirth. In New Zealand stillbirths are included in neither births nor deaths. At the same time most of the causes of a child being stillborn are the same as those that would have caused its death within 1 month of birth had it been born alive. In other words, the antenatal factors are responsible largely for the high stillbirth rate and the high

mortality rate of infants under 1 month of age. The stillbirth rate in New Zealand shows a rising tendency, but this is not sufficient to reverse the trend of the declining infant mortality rate when stillbirths are taken into consideration with this latter figure. Indeed, the unusually large decrease in both the total number of infant deaths and of stillbirths for 1932 has had the effect of reducing the combined rate or "total infant-mortality" rate to an unprecedentedly low level. Whereas, however, the rate computed on the usual method indicates a decrease of 29 per cent during the period 1923–1932, the inclusion of stillbirths reduces the improvement to 19 per cent.—*Report on the Vital Statistics of New Zealand for 1932*, pp. X–XI.

Causes of Death in Norway, 1931—According to the *Statistical Year Book for Norway*, the death rate from all causes in Norway increased from 10.5, per 1,000 population, in 1930 to 10.9 in 1931. Similarly the infant mortality rate increased from 45.6 per 1,000 live births to 46.3.

It is interesting to note which causes showed increases and which showed decreases. Of the important epidemic diseases, scarlet fever and malaria were the only two which showed reductions in 1931 over 1930, scarlet fever having decreased from 2.0, per 100,000 population to 1.4 in 1931, and malaria from 0.3 in 1930 to 0.1 in 1931. Against these decreases, typhoid and paratyphoid fever increased from 0.7. per 100,000 population, in 1930 to 1.4 in 1931; measles from 0.4 to 2.0; whooping cough from 1.9 to 2.0; and influenza from 1.7 to 9.1. The great increase in mortality from influenza is reflected in the higher mortality rates from the other respiratory diseases. Acute and chronic bronchitis as well as pneumonia (lobar and unspecified) showed marked increases in 1931 over 1930. The death rate from pneumonia (lobar and unspecified) in 1930 was 38.3, per 100,000 population, and in 1931, 41.8. Tuberculosis, all forms, however, showed a slight decrease having declined from 149.5 in 1930 to 147.5 in 1931.

The increase in mortality from cancer from 127.4 in 1930 to 133.1 in 1931 was considerable, but not entirely unexpected. Similarly the increase in the death rates from cerebral hemorrhage, apoplexy, and softening of the brain from 86.9 to 90.7, per 100,000 population, and the increase in diseases of the heart from 82.5 to 85.3 is in accord with mortality trends in other countries. Slight increases were shown also in ulcers of the stomach and duodenum, and other diseases of the stomach; cirrhosis of the liver; and nephritis; the 1931 rates for these 3 diseases, respectively, were 6.6, 1.8, and 29.5.

Probably the most noteworthy reduction in mortality was in the death rate from external violence which showed a rate of 43.0 in 1930 as compared with 36.2 in 1931. Even suicides showed a slight reduction—from 7.2, per 100,000 population, in 1930 to 6.9 in 1931. Diarrhea and enteritis also declined greatly in 1931, the rate for this year being 6.9 as compared with 9.3 in 1930. Congenital debility and malformations decreased from 32.1 in 1930 to 29.1 in 1931, and total puerperal causes from 5.2 in 1930 to 4.4 in 1931. Slight reductions were shown in the mortality from appendicitis, hernia, and diseases of the female genital organs. *Annuaire Statistique de la Norwege*. 52.18 and 24–25, 1933.

Maternal Mortality in England and Wales, 1932—According to the Registrar General for England and Wales, the annual birth rate for that country has dropped to 15.3 per 1,000 live births in 1932—the fourth consecutive year in which a decrease in the

birth rate has been experienced. A counterbalancing factor is the decline in infant mortality from 66 per 1,000 live births in 1931 to 65 in 1932. The 1932 figure has been improved upon only by that of 60 per 1,000 live births registered in 1930. Total maternal mortality accounted for 5.37 deaths per 1,000 live births in 1932 in comparison with 5.55 in the previous year. However, analysis of the total number of maternal deaths brings to light the fact that, of this number, the puerperal causes alone caused 4.21 deaths per 1,000 live births in 1932—a slight increase over the rate of 4.11 experienced in 1931, while the non-puerperal causes resulted in rates of 1.16 and 1.44 in 1932 and 1931 respectively.

Since stillbirths are now registered as well as notified in England and Wales, figures based on total births (live births and stillbirths) should prove of interest when compared with rates based on live births alone. Total maternal deaths (per 1,000 live and stillbirths) accounted for 5.15 deaths in 1932, 5.32 in 1931, 5.36 in 1930; when based on 1,000 live births alone, child-bearing resulted in corresponding rates of 5.37, 5.55, and 5.59 in 1932, 1931, 1930, respectively. It will be observed that while the rates on a wider basis are lower than those based on live births only, the ratio of mortality in both groups remains practically unchanged.—*An. Rep. Chief Medical Officer, Ministry of Health, Year 1932*, pp. 77–78.

PUBLIC HEALTH ENGINEERING

REPORT OF COMMITTEE ON SCOPE AND POLICY*

THE Committee on Scope and Policy has no formal report to make during the current year. The policy and procedure outlined by this committee and published in the Year Book for 1931–1932 are still regarded as a suitable guide for the Public Health Engineering Section. The committee has been in close touch with the Secretary of the Section and has advised with him with reference to preparation of programs in order that they might conform as nearly as may be to the policies laid down by the Committee on Scope and Policy.

Within the past few years public health engineers have been giving increased attention to the control of respiratory diseases in so far as this can be accomplished through engineering activities. In 1932 there was presented a report before the Conference of State Sanitary Engineers by the Committee on the Review of Opportunities of Sanitary Engineers in Communicable Disease Control of that organization, in which it was pointed out that there were many opportunities for the application of sanitary engineering principles to the control of communicable diseases transmitted through secretions from the nose and mouth.

This committee, on reviewing the relationship of physical environmental factors to the control of respiratory diseases was impressed with the lack of conclusive proof on many phases of modes of infection and found that there is still much difference of opinion among public health workers. The committee expressed a realization of the complexity of the problem because of the presence of many factors difficult of control, but felt that suitable research might open the way to control of certain of these diseases through public health engi-

* Presented to the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

neering activities. These activities include, among others, air conditioning in buildings in which there may be congregations of people, arrangement of interiors to prevent too close contact, dust control in interiors, and greater municipal cleanliness in public streets and public buildings.

Accordingly the Committee on Scope and Policy recommends that the Committee on Research and Standards of the American Public Health Association be requested to take such measures as it deems expedient to stimulate research in connection with modes of infection and means of preventing infection in connection with respiratory diseases; also that it be recommended to the Committee on Research and Standards that public health engineers be invited to coöperate in such research.

PAUL HANSEN, *Chairman*
EARNEST BOYCE
A. E. GORMAN
J. F. SKINNER
H. A. WHITTAKER

REPORT OF THE COMMITTEE ON FELLOWSHIP AND MEMBERSHIP OF THE PUBLIC HEALTH ENGINEERING SECTION*

THE Public Health Engineering Section still remains the fifth largest of the Association's ten Sections. On September 1, 1932, the total membership was 449 (125 Fellows and 324 active and associate members). The figures for September 1, 1933, were 118 Fellows and 289 members, a total of 407.

Forty-six new members were secured during the past year and 88 were lost through resignation, lapsing, and death, making the net loss 42.

On September 1, 1933, there were 5 Fellows and 32 members whose current dues remained unpaid, compared with 74 unpaid members and Fellows last September 1.

Due to the necessity for strict economy in the Administrative Office, promotion efforts with engineers were kept to a minimum during the early part of the year. However, 2 months before the Annual Meeting a letter of invitation signed by the Chairman, together with a list of topics to be presented at the Annual Meeting, were sent to over 800 engineers throughout the United States and Canada. About a dozen new members joined the section up to October 1, as a result of this effort, and returns are still coming in.

The Public Health Engineering Section secured this year the largest number of applications for Fellowship, having 14 out of a total of 62 applications to be acted upon at this meeting by the Governing Council.

Next year the committee plans to concentrate on the selected list of prospects it has prepared, and hopes to report a substantial increase in section membership by the time of the 1934 annual meeting. In this connection we should like to urge every member and Fellow of the section to assist wherever possible in strengthening his section by securing new members.

L. H. ENSLOW, *Chairman*
M. M. COHN
G. H. FERGUSON
L. S. FINCH
A. E. GORMAN
C. E. GREEN
A. P. MILLER
R. J. MORTON
C. L. POOL
L. B. REYNOLDS
E. W. STEEL
A. H. WIETERS

* Presented to the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

INDUSTRIAL HYGIENE

Annual Report, The South African Institute for Medical Research, Year Ended December 31, 1932—We are making several excerpts from this 71-page Report, as follows:

DEPARTMENT OF INDUSTRIAL HYGIENE

Animal experiments with dust—While there is no difficulty in setting up lesions in rabbits, guinea pigs, and rats that have been exposed to dust, the condition produced is not a true dust-phthisis as met with in the human subject, owing, presumably, to certain differences in the structure of their lungs. Monkeys are now being used for this experimental work, and the dusts under investigation are blown direct into the tracheae. To start with, there was some difficulty in arriving at a suitable anesthetic, and, acting upon the suggestion of J. B. Quinlan, of Onderstepoort Veterinary Research Laboratories, a trial was made of Eukodal, and it has proved quite satisfactory for vervet monkeys. An injection of 0.01 gm. is given by the subcutaneous route, and within less than 5 minutes a tube can be introduced through the vocal cords. The animal does not lose consciousness, it is simply indifferent. Recovery is rapid, and there is no coughing. This investigation is being undertaken with three objects in view: (1) To produce a true silicosis. (2) To compare the behavior of other dusts with the behavior of SiO_2 and to learn whether, in the presence of SiO_2, dusts become harmful which are harmless in its absence. (3) To follow the path of dust through the lungs. Is the different behavior of certain dusts related to a difference in their path of entry to the alveoli?

Dust estimation: An inquiry suggested by the International Silicosis Conference, Johannesburg, 1930—The Department of Industrial Hygiene is also directly interested in a number of problems and investigations through its collaboration with the Mine Air Committee of the Chamber of Mines and with the Miners' Phthisis Prevention Committee. Dr. Mavrogordato is the institute's representative on both these bodies, and has been actively engaged in the work described below.

The different countries and centers who have portions of their population employed in "dusty-trades" use various methods for the estimation of the concentration of air-borne dust. These methods yield results which are not comparable with one another, and the International Silicosis Conference that met at Johannesburg in 1930 urged the need for a standard method. With a standard method the results secured by different procedures for dust-control could be compared. Information of this sort was not available, and the Conference felt the need for it.

The methods in use on the Witwatersrand are the konimeter and the sugar-tube. The untreated slides provided by the konimeter do not distinguish between phthisis-producing and other dusts, while the volume of air that can be sampled by the sugar-tube is limited by the melting of the sugar in moist atmospheres. With low concentrations of air-borne dust, samples of small volume are unsatisfactory. The Mine Air Committee of the Chamber of Mines has undertaken this investigation in their Dust-sampling Laboratory. Methods have been devised for the elimination of dust other than phthisis-producing dust from konimeter slides. The extent to which these methods may influence the apparent concentration of phthisis-producing dust is still under consideration.

With regard to the use of the sugar-tube for gravimetric-sampling, the practice of using cotton-wool as the filter had been discarded on the Witwatersrand in favor of sugar, because cotton-wool did not yield a constant ash-weight. A cotton-wool yielding a constant ash-weight is now available. Cotton-wool is an even more efficient catcher of dust than is sugar, and has the advantage of permitting large samples of air to be dealt with. One can sample up to 1,000 cu. ft. of air as compared with the 12 cu. ft. dealt with under the routine procedure. The small samples were secured by a hand-pump, and took some 10 minutes to collect; the large samples take several hours, and the air is drawn by a Bunsen injector. The total catch from the 1,000 ft. samples averages about 30 mg., as compared with the 0.35 mg. averaged by the 12 cu. ft. samples. The crude catch is treated as were the samples secured by the sugar-tube. It is first ignited to remove the cotton-wool and all organic matter, and then washed in boiling water to remove the water-soluble particles. Before the final drying and weighing, the dust is washed through a sieve of 350 mesh to the inch to remove gross particles.

The dust, after weighing, can be taken up in a measured volume of water and counted in a "deep-cell" as used with instruments of the hydro-konimeter type, thus combining gravimetric and enumeration returns from the same sample. The deep-cell affords the opportunity of determining the size-frequency of the particles in our air-borne dust underground. Some 70 per cent by number of these particles are found to be of the order of 2 microns or less. It is of interest to note that these large samples compare very well as to concentration with the routine small samples. One thousand cu. ft. is about 30 cu. m., while the routine samples dealt with a third of a cu. m. One was unhappy with the third of a cu. m. samples, because the ash of the filter-paper usually exceeded in weight the total amount of dust actually caught. It has turned out that both large and small samples give an average concentration of air-borne dust amounting to about 1 mg. per cu. m.

In connection with this inquiry, the Committee on Mine Air is making trial of the Greenberg-Smith Impinger, an apparatus of the hydro-konimeter type, which admits of gravimetric and enumeration returns being carried out on the same sample. The gravimetric returns compare to a satisfactory extent with samples taken at the same time with the sugar-tube or cotton-wool. By this method slightly less dust is caught per unit volume of air than is caught by the sugar or cotton-wool. It has the advantage of avoiding the necessity for correcting on account of the dust in the sugar or the cotton-wool ash. The dust enumeration is at present performed in the deep-cell, but more experience will be required before it will be possible to correlate enumeration returns with deep-cell counting with enumeration returns by ordinary konimetry.

The different methods in use here and elsewhere for securing gravimetric returns yield results varying within quite narrow limits. This inspires confidence. On the other hand, different methods of securing enumeration returns do not yield results which correspond with any pretense to approximation. All that can be said is that the results secured by the same method can be compared with each other. While there is no correspondence between the "counts" yielded by the different methods, there is very tolerable correspondence between the size-frequency of particles caught by the different methods. It is possible that the association of a gravimetric return with a size-frequency return will be the best way for the different countries to secure results comparable with one another. The objection to size-frequency returns for ordinary routine work is that this procedure takes up too much time. It has never been suggested that all countries should adopt a standard method for all purposes; it was suggested that each country interested should return a limited number of surveys by the standard method.

Studies Underground—Various mines have been experimenting with encouraging results on methods of filtering off the air-borne dust by means of screens placed in the path of the air-current. The staffs of the Miners' Phthisis Prevention Committee appointed by the government and of the Committee on Mine Air of the Chamber of Mines have dealt with this work.

A certain amount of air-borne dust is unavoidable in mining, and a certain amount of water must be used to deal with it. Dust-surveys are undertaken with a view to tracing sources of avoidable dust, and during the past year, humidity surveys have been undertaken by the Committee on Mine Air with a view to tracing sources of unnecessary water. With the deep hot mines of the Witwatersrand it is becoming increasingly important to learn whether the relative humidity of the air can be reduced to a useful extent without prejudicing the position with regard to air-borne dust. This problem is a difficult one. Most of the shafts are timbered and have to be kept wet for various reasons; the air is nearly saturated by the time that it reaches the bottom of a wet downcast. If this saturated air heats up on its way to the working places there will be some depression of the wet-bulb unless more water is added, but the fall in relative humidity thus secured is hardly of a useful degree. It is no use scheming to control the water at the working places if the air reaches them almost saturated at their own temperature. The initial difficulty is to dry up these timbered shafts to an extent that will admit of air reaching the bottom at a relative humidity of about 80 per cent. Something is to be gained by doing away with what a golfer might call casual water arising from drippers and such like sources. This can be done if it is worth while. There remains the necessary wetting of the timbers to avoid distortion and fire risks. At present inquiry is directed toward finding means for so treating the water that evaporation is slowed down and safety secured with the use of smaller quantities and less frequent application.

PATHOLOGICAL DEPARTMENT

Cases of Interest—During the year a gassing accident occurred on one of the mines. This was subsequently stated to be due to

sulphuretted hydrogen, derived apparently from stagnant water which had been tapped in the mine. Several fatalities occurred, some within 24 hours and one 3 weeks later.

At the autopsies performed on those who died within 24 hours of exposure to the gas, the chief lesions found were as follows: An acute edema glottidis, an acute pulmonary edema with brownish colored fluid in the bronchi and trachea, and an acute gastritis; in the stomach gas was present in considerable quantities, which had the odor of sulphuretted hydrogen; this was not noted in the intestines. The blood was dark and fluid, but not chocolate colored. No evidence of sulphemoglobin was found on spectroscopic examination.

The man who died 3 weeks after the exposure expired very suddenly. During the 3 weeks his chief complaint was of some gastric disturbance; apparently, too, there was some vagal irritation, and his pulse was irregular, at times being slow, but there appeared to be little serious damage done, and he left hospital only to drop down dead suddenly.

The cause of his sudden death was not determined at autopsy nor even after histological examination of brain. lungs, liver, kidneys, heart, and stomach. The only lesion found apart from intense congestion of the organs was a gross subacute gastritis, the result of his poisoning by sulphuretted hydrogen.

It is suggested that his death was due to involvement of the vagus nerve in neuritis, initiated by the poisoning and continued by the gastritis.

Lungs Examined for Silicosis and for Tuberculosis—These examinations carried out on behalf of the Miners' Phthisis Medical Bureau, whose pathological work is carried out by the institute, numbered 491.

European cases accounted for 260, Eurafrican for 4 and Natives for 227, of which groups, 164, 1 and 45 respectively, showed no evidence of silicosis nor of tuberculosis.

Tuberculosis, uncomplicated by silicosis, was present in 11 European, 1 Eurafrican and 133 Native cases.

Silicosis, uncomplicated by tuberculosis, was present in 45 European and 11 Native cases.

Silicosis, complicated by tuberculosis, was present in 40 European, 2 Eurafrican and 38 Native cases.

One case of primary lung carcinoma was noted among the European cases.

Gangrene of the lung, associated with enlarged tuberculo-silicotic gland eroding the bronchi, was noted in 15 Native cases.

Additional Investigations (Pathological Department)—During the present year two separate investigations are being carried out, both dealing with silicosis, but on different lines.

The first deals with the pathology of the lungs of a male European who has been engaged in work connected with the Johannesburg sewerage scheme.

Some months ago Dr. Pringle, of the Springkell Sanatorium, performed an autopsy on the body of one of these workers, and, being struck with the unusual nature of the lesions in the lungs, forwarded them to the institute for further and complete examination. The pathological change was found to be an unusual type of gross, unpigmented silicosis.

Upon inquiry it was found that the danger had not been apprehended and that conditions under which these men worked were extremely bad. They worked either in unventilated tunnels or in deep open trenches, drilling with dry drills, and no attempt whatever was made to keep down the dust. The result was that the men were inhaling enormous amounts of dangerous dust. In some places, according to reliable analysis, the dust contains as much as 97 per cent free silica.

According to our observations so far completed, and taking the history into account, the pathological process set up is of a very advanced type, and is developed in a very short period of time.

In many respects the silicotic lesions are different from those which occur in the Rand miner, and, further, they approximate more nearly to the lesions met with in the experimentally dusted animals.

Up to the present it has been difficult to explain why the changes in the lungs of animals so treated do not correspond more closely to those of the natural disease as met with in miners. It is hoped, when this investigation is completed, that several problems relating to silicosis will be cleared up.

The second piece of work is a reconstruction model, magnified by 20 diameters, of the silicotic process, and shows how it involves the important structures in the region of the entrance to a primary unit of the lung.

With the help of J. de Bruyne, a technic has been evolved which has given very satisfactory results.

Since the model has been completed, we have learned that a similar technic has been employed by Millar in America, but our work has been done quite independently.

In our method a large series of serial sections, each 20 micro mm. in thickness, was cut and the required part in each section was photographed (x 20) directly upon bromide paper. Each completed negative photograph

thus prepared was then superimposed upon cardboard (0.4 mm. in thickness), and the image of the silicotic lesion with the adjacent structures in relationship with it was punched out. The punched-out objects were now accurately superimposed and pasted together, the final result being an exact replica, on a much enlarged scale, of the lesion and its related anatomical structures.

The model has been reconstructed strictly to scale in three dimensions.

The reconstructed model shows the distribution of the pigment and the silicotic nodule; it shows that fibrosis and pigmentation occur to a much greater extent than can be realized by ordinary histological examination; it confirms the view which we have long held that the silicotic lesion develops in certain definite anatomical situations in the lung substance; and it has given us reason to believe that the silicotic process causes gradual occlusion of the terminal air passages.

In this reconstruction, which is of an early silicotic nodule, the narrowing of certain parts of the terminal air passages is definitely shown, but a second model will require to be made of a nodule in a more advanced state to prove that actual occlusion finally occurs. If the occlusion of terminal passages is definitely proved, it means collapse of the affected primary unit and will explain how the massive areas of silicosis are formed.—

Obtainable through the British Library of Information, 270 Madison Avenue, New York. E. R. H.

Ventilation and the Need for New Standards—The author feels that the contamination of the air by microbes has been unnecessarily submerged in present day thinking about ventilation, and he therefore suggests that dust counts or bacteria counts should be favored as a sounder basis for estimating the purity or otherwise of the air. The conditions which make for comfort should be clearly distinguished, when necessary, from those favoring health. Several pages of valuable discussion follow.—J. S. Owens, *J. Roy. San Inst.*, 53, 11:623–635 (May), 1933. E. R. H.

Law of March 16, 1933, on the Daily Hours in Industrial Estabishments

THE law of March 16, 1933, prescribes a maximum working day of 8 hours and a maximum week of 48 hours for persons employed in industrial establishments of any kind, whether public or private, except in the postal, telephone and telegraph services, inland navigation by water and air, the fishing industry, and establishments in which only the members of the same family are employed. The law does not apply to persons occupying executive or supervisory positions or to home workers.

Longer hours may be permitted regularly in occupations, among others, with intermittent or simple processes, in those requiring little attention, in continuous industries, and in special preparatory or supplementary work that must be performed outside regular working hours.

Overtime work is permitted in case of emergency, when work must be done to machines or other apparatus, and to take care of extra orders, but shall not exceed 12 hours a week for a definite period.

The law is to be enforced by inspectors. Penalties are provided for violations.—*Rassegna della Previdenza Sociale*, Rome, June, 1933.

FOOD AND NUTRITION

The Escherichia - Aerobacter Group of Bacteria in Dairy Products—The Escherichia - Aerobacter group comprises one of the important groups of bacteria in dairy products. Milk, even under careful conditions of production practically always contains some of these organisms. The fact that the Escherichia type generally represents organisms coming from the intestinal tract of man and animals and the Aerobacter type organisms from soils and grains makes a distinction between the two types useful. The growth of Escherichia-Aerobacter organisms in dairy products is undesirable, for in addition to forming acid and gas from lactose they produce undesirable flavors and aromas. Some of the defects which have been reported as due to this group of organisms are ropiness in milk and cream and gassy fermentations in cottage cheese, cheddar cheese, milk, and sweetened condensed milk.

Two methods were employed for isolating organisms of Escherichia-Aerobacter type from dairy products. In the first method gentian violet lactose bile broth was used as an enrichment medium. Durham fermentation tubes were isolated in duplicate with dairy products diluted in multiples of 10. Gas formation was recorded after 48 hours' incubation at 37° C. Eosin methylene blue agar plates were streaked from tubes of the highest and lowest dilutions showing gas after 24 hours' incubation. Typical colonies of the Escherichia-Aerobacter types of organisms were secured from these plates. The approximate number of Escherichia-Aerobacter organisms per c.c. was determined from the fermentation tubes, by the dilution method.

A direct plating method was used for the isolation of cultures, whenever possible. Milk or cream was plated directly with eosin methylene blue agar in dilutions of 1:10 or higher. Surface colonies were secured by placing the inoculum on the surface of the pre-dried E.M.B. agar plates and then distributing it uniformly with a glass rod bent at right angle. When all of the inoculum was absorbed upon the surface of the agar the plates were inverted and incubated for 48 hours at 37° C. The number of colonies of each type was then recorded and a representative colony of each type isolated for pure culture study.

Tests employed for identification of cultures were the methyl red and Voges-Proskauer tests, utilization of citrate as the sole source of carbon, motility, liquefaction of gelatin, reduction of nitrates, formation of indol, action on litmus milk, and fermentation of glucose, lactose, sucrose, dulcitol, and salicin, with acid and gas production.

In this study, 204 cultures belonging to the Escherichia-Aerobacter group were identified on a species basis according to the scheme of classification used in Bergey's Manual. These cultures were isolated from raw milk, pasteurized milk, raw cream, ice cream, ropy milk and cream, and from defective butter. The genus Escherichia comprised 63 per cent of the cultures from the raw milk; 57 per cent from pasteurized milk; 33 per cent from raw cream, and 31 per cent from ice cream. The genus Aerobacter comprised 26 per cent of the cultures from raw milk; 10 per cent from pasteurized milk; 57 per cent from raw cream; 56 per cent from ice cream; 100 per cent from ropy milk and cream; and 88 per cent from defective butter.

The intermediate group comprised 11 per cent of the cultures from raw milk; 33 per cent from pasteurized milk; 10 per cent from raw cream; 13 per cent from ice cream, and 12 per cent from defective butter.

The most common species in the dairy products studied were *E. coli* in the raw milk, *E. pseudocoloides* in pasteurized milk; *A. cloacae* in raw cream, ropy milk and cream, and defective butter.—M. W. Yale, *J. Dairy Sci.* 16:481 (Sept), 1933.

Vitamin Tests on California and Asiatic Dates—Three varieties of dates were included in this study—Asiatic Hallawis, California grown Hallawis and California grown Deglet Noor. Three samples of each variety were tested. Asiatic Hallawi dates—pasteurized, unpasteurized and locally purchased pasteurized (Dromedary dates)—were tested for vitamin A. The pasteurized sample was also tested for vitamin C, and both the pasteurized and unpasteurized samples were tested for vitamin D. The vitamin A content was found to be nearly identical in the three samples, a small decrease being noted as a result of pasteurization or marketing conditions. No vitamin C was found in the amounts which the animals would eat.

Three samples of California grown Hallawi dates—all tree ripened, one fumigated with carbon disulphide, and one fumigated and commercially washed, were tested for vitamins A and D. The vitamin A content in the tree ripened and fumigated samples was found to be nearly the same as that of the imported Hallawis, but was much less in the washed sample. Slight vitamin D values were shown.

Three samples of the California grown Deglet Noor dates were tested for vitamins A and D. These were tree ripened, tree ripened and fumigated, and artificially matured. The vitamin A content was found to be somewhat larger in the artificially matured sample of this date than in the Hallawis. No deterioration was noted as a result of either the maturation or fumigation processes used. Only the tree ripened sample was tested for vitamin D and only a slight antirachitic value was found.—Agnes Fay Morgan, *J. Home Econ.* 25:603 (Aug.-Sept.), 1933.

The Pellagra-Preventive Value of Green Cabbage, Collards, Mustard Greens, and Kale—Previous experiments have been reported (abstract, *A.J.P.H.* 22:93 (Jan.), 1932), on canned spinach, turnip greens, green beans and mature onions. It has been necessary to continue to employ the canned product in testing green vegetables for the reason that usually they are not available in the fresh state for a sufficient length of time to permit adequate feeding experiments. However, it has been shown that the pellagra-preventive factor is not appreciably affected by the heat incident to canning.

The basic diet in the case of the tests on cabbage and collards consisted of corn meal, cowpeas, flour, lard, baker's bread, canned tomato juice, cod liver oil, calcium carbonate, sirup iodide of iron, and dilute hydrochloric acid. This diet was supplemented daily with 482 gm., including the can liquor, of canned green cabbage in one case and canned collards in another. The test period in each case was 1 year.

While cabbage was found to contain the pellagra-preventive factor, it cannot be said to protect completely even in the generous amounts given, since 1 of 15 colored females on this diet developed pellagra in 7 months. However, in view of its adaptability, cheapness and seasonal availability, green cabbage may be considered a very practicable contributory source of pellagra prevention.

Canned collards were found to be a satisfactory pellagra-preventive supplement, since in a group of 16 colored females, 13 of whom continued the diet for 1 year, none developed pellagra.

In the test on mustard greens and kale, the basic diet was the same as in the case of cabbage and collards, except that baker's bread was omitted. The daily allowance was 533 gm. in the case of canned mustard greens, and 534 gm. in the case of kale. While mustard greens contain the pellagra-preventive factor, they cannot be regarded as a rich source of it. Of 14 white females on the kale-supplemented diet, none developed any symptoms of pellagra.—G. A. Wheeler and D. J. Hunt, *Pub. Health Rep.* 48:754 (June 30), 1933.

Effect of Carbon Dioxide and Sodium Benzoate on Vitamin C Content of Orange Juice—The processes used in this experiment were:

1. Freezing and storage in the frozen condition
2. Addition of not more than 0.1 per cent sodium benzoate to canned or bottled juice
3. Carbonation—that is, treatment with carbon dioxide gas under pressure previous to bottling and pasteurization

Two samples each of California valencia and navel orange juices which had been kept in frozen storage for 8 to 18 months showed antiscorbutic value fully equivalent to that of freshly extracted orange juice. A daily dose of 2 c.c. afforded complete protection in all cases.

A sweetened orange juice, similar to preparations on the market, prepared in two forms—with and without 0.1 per cent sodium benzoate—was tested for antiscorbutic activity. This preparation appears to have at least two-thirds the vitamin C value of whole fresh orange juice, the diminution being due no doubt to the dilution with sugar. Sodium benzoate appeared to have no deleterious effect upon the vitamin C.

To study the effect of carbon dioxide upon the preservation of vitamin C, 5 samples of the orange juice products were prepared as follows:

1. Slightly sweetened valencia orange juice, diluted with water containing 0.1 per cent dissolved carbon dioxide
2. The sweetened juice, diluted with water but containing no carbon dioxide
3. Frozen, untreated, whole valencia orange juice
4. The frozen juice, packed in bottles, but pasteurized for 25 minutes at 63° C. and treated with carbon dioxide at a pressure of 2.5 kg.
5. The frozen orange juice, pasteurized as above, but without carbon dioxide treatment

Nearly complete protection from scurvy was provided when 8 or 9 c.c. daily doses of sample 1 were given. Sample No. 4 retained the full vitamin C value of the fruit juice which it contains, 6 or 7 c.c. being approximately equivalent to 1 c.c. of freshly extracted orange juice. It is not surprising that carbon dioxide treatment should have this protective effect when the sensitiveness of vitamin C to oxidation is recalled.—Agnes Fay Morgan, Catharine I. Langston and Anna Field, *J. Indust. & Eng. Chem.* 25:1174 (Oct.), 1933.

CHILD HYGIENE

A NEW RAMIFICATION OF THE DENTAL PROBLEM

JOHN OPPIE MCCALL, D.D.S.

Director, The Murry and Leonie Guggenheim Dental Clinic, New York, N. Y.

IT is no longer news that dental decay is one of the most, if not the most, prevalent human diseases and that the infections and functional disabilities which follow uncared-for dental cavities are a potent source of ill health. Medical men as well as dentists are concerned over the undermining of community health which is recognized as being progressively on the increase from this cause. For this reason much research work is being carried on in both medical and dental institutions in the effort to learn the ultimate causes of dental caries and the means for its prevention.

Pending the discovery of the solution to those problems, increasing efforts are being made to stem the growing tide of dental disease through various community activities directed toward the amelioration of the situation. These efforts follow two differing but related courses. One is the dissemination of such knowledge as is now available regarding means of preventing dental caries. This is carried on through the usual educational channels, with special emphasis on the application of preventive measures in childhood. The public school is a natural and effective medium through which these educational messages may reach the people. The other course is the provision of such operative treatment, both the filling of teeth and their prophylactic cleansing, as is feasible. Here, too, the school has been looked upon as constituting the proper *locale* for the carrying on of this activity.

This latter belief has been reached partly by following the line of least resistance, and also the line indicated by the trend of professional concept as to the best means of attacking the problem of existing dental disease. That is to say, the school is the natural gathering place of virtually all the children in any community above the age of 5, hence it offers an opportunity to conduct dental examinations and give dental treatment on a community-wide basis. Also it has so far been the belief of the dental profession, as it has progressively studied the problem of coping with dental disease on a broad basis, that a program for giving dental care to be begun at the average age for entering school, that is, 6 years, would satisfy such criteria as might be set up for such a project.

It should be explained that the thought of giving dental care as a community project first attained a prominent place in dentists' minds about 30 years ago and at that time dentists began making voluntary surveys of various schools, to determine the dental conditions obtaining among school children. One of the outstanding facts brought out in these early surveys was the prevalence of serious damage suffered by the so-called 6-year molar. Since impairment of masticating efficiency and serious malformations of the dental arches were found to be due to early loss of this tooth, it soon became the rallying point of those who were interested in dentistry for children, and its preservation became the immediate goal of the pioneers in this movement.

The coincidence of 6-year molar eruption and school entrance, plus the convenience of established machinery for supplying the necessary contacts, served to make children's dentistry a school function.

At that time there was no appreciation on the part of either dentists or physicians of the influence of dental infection on the general health, hence little attention was paid to decay and abscess in the deciduous teeth. As the years have gone by, dentists have begun to realize the seriousness of focal infection resulting from decayed and abscessed teeth, even in the deciduous dentition. They have also found that much irregularity in the position of the permanent teeth, including the first permanent molar itself, is traceable to decay and loss of the deciduous teeth, especially the deciduous molars, and also that the incidence of caries in these teeth is showing an alarming increase. With the realization of these things comes the necessity for recasting the program of dentistry for children. While the first permanent molar still deserves serious consideration, it can no longer stand as the first point of attack in the community dental program. It is imperative that plans be developed for giving comprehensive attention to the deciduous teeth and to provide this care before the child enters the public school system.

In addition to the health consideration mentioned, the matter of economy dictates this move. It is less expensive to fill cavities while they are small, and there is good reason to believe that fewer cavities will form in a mouth receiving periodic care. With preservation of the deciduous teeth there will be less irregularity of the permanent teeth, and this means a lower cost for the care of these teeth throughout life. The argument for beginning dental care early in the preschool period is given weight by the following figures gathered at The Murry and Leonie Guggenheim Dental Clinic in New York City.

This clinic began operation in its present building September 14, 1931. Up to October 7, 1933, 10,147 children have been received there as patients. The usual age of admission for new patients is from 2 to 10 years. There have been a few admissions over this age limit. Since all children in the clinic district who are financially eligible are received, the findings may be accepted as constituting a cross-section of the dental condition of the preschool and school population of Greater New York. Of these children only 230 were free from caries; this means that 97.7 per cent had one or more cavities of decay.

While these figures are higher than those usually given as the result of school surveys, they will not occasion surprise, at least to dentists. What may cause both surprise and concern to dentists and to all others interested in health matters is the way in which the percentages mount, beginning at an age well below that of school entrance.

In the absence of an organized means for registering all preschool children, dependence is placed on day nurseries and similar organizations and on letters to parents known to have children below school age. Figures for this group are not, therefore, available for cross-section figures. When, however, we relate the percentage of caries shown below to the total percentage for all ages up to 10, given above, we are justified in believing that findings for the entire preschool population would coincide rather closely with those given. They indicate not only an early beginning but a rapid increase, in extent, of caries in most preschool children. Incidentally comparison of the total caries incidence with the figures for preschool children indicates that the 2.3 per cent average for freedom from caries is derived almost entirely through the inclusion of pre-

school figures in the total tabulation. In other words, caries is found to be practically universal among children *of school age* in New York City.

The following figures for preschool children are tabulated on yearly levels.

With increase in incidence of caries and number of cavities goes, naturally enough, increase in their size and probability of pulp involvement with its sequel of dental abscess. An alarming number of children entering kindergarten are found to have many unsavable teeth and to be in need of time consuming operations on those that are savable. It seems fairly obvious, then, that both health and economic considerations demand the setting up of machinery for the registration of all preschool children and the institution of systematic dental care for them. The age of 2 would seem to be the logical age at which to start this program.

CARIES IN PRESCHOOL CHILDREN

2 years—32 patients
- 56% have cavities
  - 35% have 1–6 cavities
  - 21% have 7 or more cavities
  - Largest number of cavities in one patient—17

3 years—168 patients
- 83% have cavities
  - 43% have 1–6 cavities
  - 40% have 7 or more cavities
  - Largest number of cavities in one patient—20

4 years—425 patients
- 91% have cavities
  - 36% have 1–6 cavities
  - 55% have 7 or more cavities
  - Largest number of cavities in one patient—31

PUBLIC HEALTH NURSING*

PUBLIC HEALTH NURSING AT THE INDIANAPOLIS A.P.H.A. MEETING

First Joint Session

Monday morning, October 9, the Public Health Nursing Section had a joint session with the Child Hygiene Section and the American Association of School Physicians. The comparatively small maximum attendance of 150 at this session was no index of the significance or interest of the ideas expressed in the papers. Although one physician insisted that school teachers should teach and if they could not, they should be fired, and that physicians connected with school systems should practise medicine, not teaching, the consensus of opinion as indicated in the discussions seemed to be that teachers need to be better trained to teach both in their own special fields and in the field of health education—and school physicians and nurses could be more effective if they were more skilled in the fundamental principles of education.

Business Luncheon (Monday noon)

Elsbeth Vaughan, R.N., St. Louis, Chairman of the Public Health Nursing Section, presided.

The section voted to have the following new committees appointed.

1. On Historical Review and Restatement of Objectives of the Public Health Nursing Section.

2. On Membership and Stimulation of Fellowships in the Public Health Nursing Section.

3. On Study of Nursing Services in State Health Departments in Coöperation with the N.O.P.H.N.

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

The following nursing Section Council and Committee representatives were elected:

Chairman—Pearl McIvor, Washington, D. C.
Vice-Chairman—Naomi Deutsch, San Francisco, Calif.
Secretary—Eva F. MacDougall, Indianapolis, Ind.
New Councillor—Ann Heisler, St. Louis, Mo. (Term expires in 1938).
Nurse Member on A.P.H.A. Nominating Committee—Katharine Tucker, New York.
Nurse Member on A.P.H.A. Membership and Fellowship Committee—Alma Haupt, New York.
Lillian A. Hudson of New York is section representative on the sub-committee on Training and Personnel.

Section Councillors and years their terms expire are:

Ruth Houlton, Minneapolis, Minn.	1937
Amelia Grant, New York	1936
Elizabeth Stringer, New York	1935
Marguerite Wales, New York	1934

The Tuesday Afternoon Nursing Section Session

This drew an attendance of 260. Watch the *Journal* for Miss Wales' paper on "The Contribution of Public Health Nursing to Communicable Disease Control" which was discussed from the floor by Dr. Louis I. Dublin and Haven Emerson, M.D., of New York. The papers written by Agnes Talcott and Marion Randall were eagerly listened to, and every nurse sat on the edge of her chair drinking in what Alma Haupt had to say about "How to Fit Public Health Nursing into a Budget."

There were about a dozen men in the audience. We hope most of them were health officers. Dr. Peter of Cincinnati and Dr. Decker of Los Angeles were recognized among them.

The Wednesday Morning Nursing Section Meeting

"Team Play Between Public Health Nurses and The Medical Profession" read by Dr. W. W. Bauer of the American Medical Association proved very interesting, and the discussion of it by Louise Nichol, R.N., of the Illinois State Health Department was just as good. There was good natured disagreement between the two on some points, and a spirited discussion from the floor by Miss St. Clair, Miss Tucker, Mrs. C.-E. A. Winslow, and Miss Havey.

The second part of the morning program on the "Use of Laymen in Official Public Health Nursing Services" was discussed by Dr. Dowling of Alabama, Mrs. Blackstone of Wisconsin and Mrs. Trawick of Tennessee, the latter two emphasizing the rural point of view, and interspersing their papers with apt and witty stories. An interesting outcome of this last phase of the program was the eagerness with which the three speakers got together to compare notes after the meeting.

The Thursday Afternoon Joint Session With the Indiana State Nurses' Association and the State League of Nursing Education

The attendance was 360, the room was packed to hear Dr. John Sundwall of Michigan speak on "Health a Factor in Quality Nursing" and Mary Beard, R.N., of New York on "The Undergraduate Curriculum a Factor in Quality Nursing."

Marion Howell of Cleveland was unable to come to the meeting to discuss Miss Beard's paper, and Shirley Titus, Dean of Vanderbilt University School of Nursing, Tennessee, took her place. She put her discussion in the form of the following questions:

1. Is Nursing that is worthwhile quality nursing?
2. What place does health occupy today in social well-being?
3. Is the curriculum that emphasizes disease rather than health an adequate one?
4. Is a nursing school to prepare nurses for specialties?

5. Is public health nursing a specialty?

6. Can a nurse be effectively prepared for public health nursing if public health education has to be superimposed on hospital technics and ethics?

7. What to do about a curriculum which is a product of utility? Should it be arranged according to function?

An Extra on the Program

One of the most stimulating and helpful nursing sessions at the Indianapolis meeting was the luncheon meeting informally arranged by the N.O.P.H.N. for public health nursing executives on Wednesday at the Lincoln Hotel. Fifty nurses sat down together and when each introduced herself at the request of Miss Tucker one had to marvel at the great number of states and types of services that were represented by public health nurses who felt the Annual Meeting of the American Public Health Association was valuable enough to justify them in paying their own expenses to attend it, as many of them did. Predominating in the group were state supervising nurses, directors of visiting nurse associations, directors of official city health department nursing services, public health nursing course directors, etc. It was an elite group.

After the luncheon the group remained and for 2 hours, under Miss Tucker's leadership, discussed Rules and Regulations No. 7 of the Federal Emergency Relief Administration as they applied to public health nursing.

The proposed schedule for the N.O.P.H.N. sessions and joint sessions for the Biennial Convention to be held in Washington, D. C., in April was furnished each nurse and there was a general discussion about it.

More Personal

One distinguished Fellow of the Public Health Nursing Section of the A.P.H.A. who attended the meeting was Miss Elizabeth Smellie of Ottawa, Canada, who is Superintendent of the Victorian Order of Nurses for Canada and Honorary Consultant in Public Health Nursing to the Ontario Health Department.

Miss Smellie and Miss Lillian A. Hudson of the Department of Nursing Education, Teachers College, Columbia University, spent an evening at the home of Dr. and Mrs. Willis D. Gatch where the main topic of conversation was public health nursing. Dr. Gatch is Dean of the Indiana University Medical School and Mrs. Gatch, Miss Smellie, and Miss Hudson are all alumnae of Johns Hopkins Hospital Nursing School. EVA F. MACDOUGALL

EDUCATION AND PUBLICITY*

Indianapolis in Retrospect—Our best attended session and one which held the audience to the end, was the "panel" meeting with the subject, "Is there a common objective in public education around which all health organizations can rally?" Dr. Winslow as chairman very skilfully held the group of panel members to a practical discussion of the question. Each member proposed an objective and through discussion, there were eliminated: the importance of periodic health examination; a campaign against quackery; the importance of adequate medical care for everyone; the value of personal health. The consensus of opinion, with the audience agreeing, was that all health agencies should join this year in stressing the importance of maintaining adequate public health services. A continuation of this discussion by local health councils might be well worth while. For further information on how to go about it write to Dr. H. E. Kleinschmidt who arranged this panel session.

The two papers which we believe will be of exceptional value to workers in health education are: Mary P. Connolly's story of how adult groups are brought together for health education in Detroit, and Dr. M. O. Bousfield's account of how best to reach the negro community with health education. These will be made available to *Journal* readers.

The Health Education Institute under Dr. Galdston's leadership was again a successful feature of the Conference program and it was voted at our business session to ask for its continuance another year. With the prospect of a meeting next fall on the Pacific coast, there is likely to be an entirely new group for attendance at an institute.

M. S. R.

The "Makings" for Magazine Articles—Data from the field are necessary for the writing of articles on public health topics. There is little doubt that many more articles would be published if varied information, interesting and valuable, could be supplied to writers.

The material is to be found in annual reports, research reports and studies of many types, clinic records, case stories, etc. A line or a paragraph, an incident or other example even, may provide an article angle or theme about which material may be assembled by the writer. Whatever will help to define or to explain a public health problem or situation will be useful.

Health councils and all other local and state groups of health workers are invited to discuss how to bring this opportunity to the attention of health agencies. Likewise every individual health worker is invited to collaborate in this effort for the common good. State departments and state associations could help in explaining the idea to local agencies.

Please ask the editor of this department at 130 East 22d St., New York City, for full information.

In Place of a Speech—There are a lot of ways to use spoken words in presenting ideas and information, without making a speech. A dozen or more examples will be mailed to you, if you will look them over, promising that if you discover an omission you will

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

briefly describe the omitted form. Please drop a postal card to the editor of this department.

Objectives in Cancer Education—Twelve pages on "Cancer Education in Massachusetts," by Dr. Mary R. Lakeman, form a valuable contribution to the study of resultful popular health education. These 12 pages constitute a chapter in *Cancer and Other Chronic Diseases in Massachusetts*, by Dr. G. H. Bigelow and Dr. Herbert L. Lombard. Houghton Mifflin Co., Boston. 1933. Says Dr. Lakeman:

> The educational program as outlined presented these main objectives:
>
> 1. To give people of adult years sound information about cancer, so that they may act with intelligence when occasion demands.
> 2. To give wide publicity to the fact of the curability of early cancer.
> 3. To keep the people living in the neighborhood of each clinic informed of the day, hour, and place of the clinic.
>
> It was considered to be of special importance that everyone become familiar with the cardinal signs which should arouse a suspicion of cancer; namely, the lump anywhere in the body, the unhealed sore, the unaccustomed discharge from a body orifice. Hence, during the first two or three years of the Massachusetts program the chief emphasis in all publicity given out was laid on these signs.
>
> A definite effort is being made to change the attitude of mind toward cancer. Among older women, we meet on all sides an unwillingness to face the problem, a sense of horror which forces people to turn away when the word is spoken. This attitude seems to exist in far less degree among younger women. Taking advantage of the open-minded interest of youth, the department is now making a definite approach to college students of biology and other natural sciences, with the purpose of creating a more wholesome attitude toward the problem in those people who, because of their background are capable of grasping the significance of cancer research, and who are potentially leaders in their individual communities.
>
> It was realized at once that if the incidence of cancer in Massachusetts were to be lessened it was of major importance that individuals showing early or suspicious signs of cancer be brought under medical observation much earlier than had been the case in the past. Surgeons everywhere were bemoaning the fact that patients were coming to them far too late for hope of permanent relief, yet in many forms of the disease the same surgeons tell us that a large proportion of the cases are curable if proper treatment is applied in the early stages.

Warmth of Speech and Cold Type—A correspondent has sent us a copy of a press release issued by a public health agency. At top is "Press Service," to which our correspondent has added "The World's Worst."

The entire release reads much like a verbatim report of a talk built of rather showy, but unsubstantial words and phrases, loosely thrown together without aid of a good editorial blue pencil, even to secure accepted English grammar. Personality often helps a speaker to get by with careless grammar and slipshod thinking. Before you decide to turn a pleasant sounding speech into reading matter, listen to the sentences, *as* sentences. Note the percentage of facts or ideas per 5 minutes of talking time. Note especially whether loose ends of ideas are left hanging because the speaker intended to come back and fit them neatly into a larger idea later, but forgets to do it as new words intrigue him.

Hygeia, November, 1933—"Poisons at Home" (chemical dangers in modern homes); "First Eyeglasses at Middle Age"; "Stop That Cough!" "Feminine Beautification: A Quest from Ancient to Modern Times" (part I); "Anxieties and Worries"; "Training for Athletics and Health" (part II); "Must the Tuberculous Be Dependent?" (rehabilitation through work); "The Committee on Foods Accepts Bread"; "Posture"; "Sex Education (part V: The School Child"); "Before Baby Is Two" (part I: "Making the Right Kind of a Home"); "Progress in Preventive

Medicine" (part IX); "Then—and Now: A Century of Progress in Surgery"; "I Want to Know: A First Physiology" (part III); "New Books on Health"; "Questions and Answers"; "School and Health," including "Wit and Humor: New Source of Power in Health Education"; "Teaching Health"; and "New Health Books and Teachers' Materials."—*Hygeia*, 535 North Dearborn St., Chicago, Ill. Nov., 1933. *Sample free.*

"Damaged Lives": A New Motion Picture—The new picture was introduced to public health workers during the A.P.H.A. meeting at Indianapolis. Says *Journal of Social Hygiene* (Oct., 1933):

> After careful consideration, and study of opinions received from several hundred physicians, health and governmental officials, social workers, nurses, and representatives of religious, educational, and other organizations, the Executive Committee of the American Social Hygiene Association has agreed to endorse the motion picture drama "Damaged Lives" recently produced by Weldon Pictures Corporation and dealing with the subject of syphilis. The film, with a supplementary medical lecture film, is expected to be shown in selected representative theatres throughout the United States, the premier showing being at the Majestic Theatre in Boston, on September 15, with the coöperation of the Massachusetts Society for Social Hygiene, the Massachusetts State Department of Health, and other state and city agencies.
>
> This represents the first union of forces between recognized health agencies and commercial producers in the United States in an attempt to combine the technic of sound motion picture photography with authoritative health information for showings in commercial motion picture theatres for paid admissions. In the opinion of competent medical and educational authorities, this union will have far-reaching and important results in adult mass education.
>
> The production is the culmination of 5 years of study by motion picture producers, in coöperation particularly with the Canadian Social Hygiene Council and with the American Social Hygiene Association, regarding preparation of a modern talking picture drama which might be a worthy successor to Brieux's "Damaged Goods," produced 20 years ago on stage and screen, and the Association's silent drama film, "The End of the Road," which was shown throughout the United States shortly after the World War in connection with the Government's campaign against venereal diseases. Competent critics of all three productions consider "Damaged Lives" by far the most potentially effective in its educational possibilities. It is an appealing human story, produced with extraordinary good taste, is well cast, well acted and well photographed.

The first public showing in the United States, held in Boston, was presided over by the State Commissioner of Health, with speakers representing the Boston Health Department, the dramatic editors of the city, and other groups. There was a distinguished group of patrons and patronesses. It would seem that other cities might make a significant event of the local showing of the picture. See *Journal of Social Hygiene* for additional information, and address inquiries to American Social Hygiene Association, 450–7th Ave., New York.

Where to Find It—The difficulties in tracing health education activities are illustrated by one of the best annual reports. "Educational work" was found under "Maternity, infancy and child hygiene division." It was supplemented by 2 of the 7 sub-headings in the text. There was no tie-up between health education and "Nutrition service," another main heading. "Public health education division" carried 11 subtopics. Other references: "Radio health talks"; "public meetings" and "radio health talks" under "Sanitation division"; "educational activities," "lectures," and "literature distributed" under "Social hygiene division"; and "educational activities" under "Tuberculosis division."

Could we have all of the above references recognized under "public health education" supplemented by a

cross reference under "health education, public"?

Likewise could there be an index clue to such specialties as "research," "surveys," "statistics," etc.?

The most elaborately indexed of all health organization annual reports contains no references to popular health education. One finds it as "films," "literature," etc., sub-titles under a variety of headings. The illustrations of health education activities usually included are not indexed at all.

The more adequate the indexing the more widely usable and useful will be reports of our own and other cities and states.

Invitations and Reminders—may at times be varied by some simple, inexpensive "dressing up."

Of course there are times when novelty especially if it gives a light touch to your facts or your announcement is inappropriate but there is a wide range of usefulness for non-solemn communications.

A memorandum issued by Social Work Publicity Council, 130 East 22d St., New York, tells how novelty papers may be used for inexpensively "dressing up" mimeographed or multigraphed announcements and how attention-getting covers may be added to very modest invitations and other simple forms. Send *10 cents* for a copy. Several samples of materials are attached to the memorandum.

Dear Editor: Would It Be Worth While?—We have urged that more use be made of good copy which has appeared in various health periodicals. Much that has been written for a single city or state, or a specialized national group, should have a wider audience.

Could we double the size of this department in the *Journal* we would like to fill the added space with sample quotations from journals and house organs, radio talks, news releases and printed matter.

Executives and editors who see many health periodicals may not realize how limited is the range of professional periodical reading by the rank and file. And the health reading of the general public is far more limited.

The subject of *method* in popular health education and publicity receives little attention in national, state and local health periodicals. Among national health journals only in the nursing field is much attention given to methods and materials for promotion and interpretation, except for the materials and projects of the national agencies.

True, more than 5,000 health workers have the opportunity of reading this department of "Education and Publicity" material in the *Journal*. But even that circulation does not cover all staff members of health agencies. Nor does it touch many of the board and committee members and other volunteers, nor the leaders in the countless organizations of men, women, and young people which carry some of the health education job.

Hence and therefore, dear editor, will you consider if you could quote from this department? In some cases you could quote what we have quoted, giving such credit to the original producers as may be fair and desirable. In some other cases you would give credit to the *Journal* and, if possible, to the Education and Publicity department. Try it tentatively?

A lot of material which already has appeared from month to month may be quite usable at the present time.

BOOKS AND REPORTS

A Practical Medical Dictionary—*By Thomas Lathrop Stedman, A.M., M.D. (12th ed.) Baltimore: William Wood,* 1933. 1256 pp. Price, $7.00, Thumb Indexed, $7.50.

We welcome the 12th revised edition of this Dictionary which has had an established place with the profession since its first issue in 1908. The present work has had about 1,000 new words added to it and several hundred new sub-titles. It includes also all the changes in the British Pharmacopoeia of 1932. This increase in words has necessitated the addition of 33 pages.

It is manifestly impossible to read every word in a dictionary. One is reminded of the young man who was reading a dictionary, and when asked how he liked it, said he found it "very interesting though it changed the subject too often." By looking for a number of new and test words we arrive at the conclusion that the dictionary is very complete and up to date. An appendix gives a table of drugs, their doses, and uses; weights and measures; comparative temperature and barometer scales, and a list of the microparasites pathogenics for man and some animals. The printing and illustrations are of the high quality for which this publication has been noted. One can feel no hesitation in recommending it thoroughly to the profession. MAZŸCK P. RAVENEL

Fetal, Newborn, and Maternal Morbidity and Mortality—*White House Conference. New York: Appleton-Century,* 1933. 486 pp. Price, $3.00.

The subject matter of this conference report is divided into two parts. The first is a summary of the findings and includes a set of recommendations and a bibliography. The second and larger part is devoted to a discussion of the various elements entering into fetal, newborn and maternal morbidity and mortality. It is in the form of a series of monographs with numerous reading references and on this section the summary and recommendations are based.

Inasmuch as the recommendations seem to include about all that present-day knowledge of the subject authorizes, they are given in full.

1. Efforts must be increased to provide better prenatal care for more women. In general, only early diagnosis allows adequate treatment of a disease which complicates pregnancy and is likely to harm mother or baby.

2. A warning should be disseminated that compliance with the insistent demand made by women for shorter and more comfortable labors inevitably implies risks both for mother and baby.

3. Interference with pregnancy or labor should be limited to well defined indications.

4. In view of the fact that abortions are responsible for a large part of maternal mortality and, particularly, for later maternal morbidity, all febrile cases of abortion should be hospitalized.

5. Appropriate changes should be made in official birth and death certificates so that more and more precise information can be obtained concerning the actual causes of death of either mother or infant in connection with pregnancy and birth.

It will be seen that nothing especially new has come of this study, but what is known has been worked into shape for easy reference.

MERRILL E. CHAMPION

Our Movie Made Children—*By Henry James Forman. New York: Macmillan,* 1933. 284 pp. Price, $2.50.

This book is a summary of the results of a 4-year nation-wide study by a group

of skilled investigators. In it we have a collection of facts secured in schools, colleges, children's homes, courts, and institutions of various kinds.

A popular opinion that most of the movie details go over the children's heads is thoroughly disproved by tests with 3,000 persons. "The amount that average children carry away is astonishing" and, strange as it may seem, they actually recall more of a picture at the end of a week than on the day after it was seen.

Emotional excitement has been carefully measured and found to be very great with most children. This is because they see the scene as actual life whereas adults can reason "it's only a picture." Since this emotion can be relieved only slightly in a theatre by physical action, it is especially dangerous.

Children's sleep is adversely affected by movies. This has been demonstrated with the "hypnograph"—a delicate instrument for recording restlessness. Either the sleep is more fitful than normal or it is in the nature of a drugged stupor, similar to that caused by extreme fatigue. Exciting pictures often show these effects on sleep for several days.

Easy money, fine clothes, luxury, wild parties, sex suggestions, exert an insidious appeal. Young people report the movies a liberal education in lovemaking with the sex side often overemphasized. "The road to delinquency is heavily dotted with movie addicts and it needs no crusaders, or preachers, or reformers to come to this conclusion."

Everyone interested in the physical, mental, or moral welfare of children should read this book and take a positive stand against the evils that are exposed. Parents should consider carefully the seriousness of the facts and supervise the movie-going habits of the children as far as possible.

JOHN HALL

A Short History of Dentistry—*By Lillian Lindsay. London: John Bale, Sons and Danielsson,* 1933. 88 pp. Price, $1.25.

With the increasing interest in dentistry as an aid to public health this little book is timely. Short as it is, it gives an excellent survey of the evolution of the science and art of dentistry. The many studies in various parts of the world, as to the effect of various foods on the development of the teeth and their health is another reason which makes this book valuable. Few advances were made until about a century ago but dentistry now occupies a safe place in the scheme of public health. We recommend this little book to all who are interested in this fascinating subject.

MAZÝCK P. RAVENEL

I Go Nursing—*By Corinne Johnson Kern. New York: Dutton,* 1933. 256 pp. Price, $2.50.

Nurses are often accused of being too inarticulate about the many human interest experiences they have in the round of their duties. Here is a nurse who has loosened up and given us a peep at life as she saw it and lived it while a pupil nurse in a large hospital nursing school, and later as a private duty nurse, the locale of whose activities ranges from San Francisco and its environs to a lumber camp on the Canadian Border and a cottage in the Canadian Rockies.

The nurse shows a keen insight into the psychology of her patients and unusual powers of observation. She gives the impression of being slightly "hard boiled" and cynical, yet she knows how to appeal to the reader's emotions. The book is decidedly interesting.

The experiences here depicted fall in line with what most people, who do not know much about nursing, traditionally think every graduate nurse meets; but most modern nurses will be indignant at the impression this book is apt to

give, that all nursing school supervisors are only professional snoopers and deserve only secret disrespect; that a nurse cannot get through some of the harrowing experiences of night duty without doping herself on bromides or black coffee; and that a nurse can watch a patient die in a large hospital and, apparently without having a physician see him, prepare him for the morgue and, with another nurse, deposit him in the morgue. EVA F. MACDOUGALL

The Road to Health—*Book I and Book II—By Herman M. Bundesen, M.D., and Corrine Manry. San Antonio: Laidlow Bros.,* 1932. Price, Book I, $.52 and Book II, $.56.

The First Book gives a clear view of the fundamental health activities which should be carried out in the daily life of every child—the first need in child training. The different activities are emphasized in story form with colored illustrations.

The authors have written this Second Book to follow up the First Book, stressing the fundamental health activities which should be carried on daily. Lists of questions are given throughout which could be nicely correlated with the morning health review.

The illustrations are very well done and make the book interesting to the child of this age group. These books should prove valuable allies in carrying out a health-education program.

BESS EXTON

Report on General Survey of the Problems of Sewage Treatment and Disposal in Willamette River Valley, Oregon—*State of Oregon, Reconstruction Advisory Board.*

State-wide demand for abatement of stream pollution in the Willamette River Valley brought about the appointment of a consulting board by the Governor of Oregon, which studied the existing conditions, assembled data on sewage disposal at the Willamette Valley cities and on the financial status of those cities, then pointed out definitely what improvements were needed in the 40 or more towns, cities or localities to bring about cleaner conditions in the Willamette River. The report is available at the office of the Reconstruction Advisory Board, Spalding Building, Portland, Ore.

ARTHUR P. MILLER

Safety First for Little Folks—*By Lillian M. Waldo. New York: Scribner,* 1933. 165 pp. Price, $.64.

That safety education has definitely established its place in the elementary schools is proved by statistics which show a steady increase in fatalities for adults and for children of preschool age, and a marked decrease for children of school age.

The story centers around a little girl who dreamed that she took a trip to Danger Land and who tells of her experiences with the crippled children she met there. The safety lessons drawn are correlated with civic instruction to show children what the community is doing for their welfare and how they can coöperate. The book contains a number of illustrations.

A very good book for children of the third, fourth, and fifth grades if studied under the supervision of an understanding teacher. BESS EXTON

Frontiers of Medicine—*By Morris Fishbein, M.D. Baltimore: Williams & Wilkins,* 1933. 207 pp. Price, $1.00.

Modern medicine is so significant to the layman that the story of its progress from earliest times to the present should be as fascinating to him as to its own practitioners. In this little book, one of the Century of Progress Series, medicine's chief impresario has told the story concisely and well. About half of the book is devoted to medical history prior

to the glorious days of Pasteur, the chemist who founded the modern science of medicine, while the remainder is concerned with the present aspects of this profession, both as an art and a science. Preventive medicine is described in various chapters, although somewhat sketchily, due mainly to the limitations of space. The book is well printed but has no index. It should prove of interest to anyone who desires a succinct history of the development of medical science in all its branches, and will serve to inspire the reader with an appreciation of the scope and beneficence of this most important art.

JAMES A. TOBEY

Public Health Nursing in Industry—*By Violet H. Hodgson. New York: Macmillan,* 1933. 249 pp. Price, $1.75.

Industrial nursing has been the least clearly defined of all the phases of public health nursing. Because it has been under individual industry control, the administrative set-ups have been various, and the methods, procedures and programs have been very diverse, as have been the qualifications of the nurses employed. Books have been written about school nursing, visiting nursing, and tuberculosis nursing; but except for Florence S. Wright's brief monograph written 12 years ago, Mrs. Hodgson's book is the only one in the field of industrial nursing.

Plant managers and industrial physicians as well as industrial nurses will welcome Mrs. Hodgson's book in which for the first time is brought together the current practices of industrial nursing, and the definite objectives and principles of this service. The relationship of the nurse to the physician, the plant managers, the employees, and the community agencies is definitely defined. Suggestions are given for various types of set-up, both inside and out of the factory, including plans for affiliation with community public health nursing agencies. Standing orders, lists of equipment, records, methods, and procedures are outlined in detail. In fact, this book is to industrial nursing what the *Manual of Public Health Nursing* is to public health nursing in general, and should be available for all plant managers, industrial physicians, and nurses.

This book should be the starting point for further contributions in this field, contributions which will detail the various plans which are based on the fundamental principles of industrial nursing so ably given by Mrs. Hodgson.

VIRGINIA A. JONES

To Be or Not to Be, A Study of Suicide—*By Louis I. Dublin, Ph.D. and Bessie Bunzel. New York: Harrison Smith and Robert Haas,* 1933. 443 pp. Price, $3.50.

Statistical study of suicide discloses some interesting facts which lead to a speculation as to causes in this complex problem. As a background for the study proper, the changing ideas of various groups and civilizations in connection with the act of suicide are presented. The author is well aware of the complexity of the problem, since it is bound up with the habits, customs, and standards of life of individuals and communities as well as with the value which these attach to life. He has carefully studied not only the records of the Metropolitan Life Insurance Company, of which he is statistician, but also official records here and abroad, and bases his analyses on data so obtained.

In the majority of countries studied suicide rates were higher during the years 1926 to 1930 than during the prewar years 1910 to 1914, and a distinct upward trend was noted during the postwar period. Although the American negro is much less apt to commit suicide than the white, nevertheless other colored peoples show high rates, so that

suicide is not held to be primarily a racial trait. Analysis of suicides among urban and rural peoples shows a much higher frequency among the former. American data harmonize with a British study which indicates that suicide predominates at both ends of the social scale, although chiefly at the upper end.

The low suicide rate in Roman Catholic countries is thought to be related to the authority of the church in which members accept guiding precepts without question, and the church forms the background of communal life. Protestant suicide rates are distinctly higher than Catholic, but by far the greatest recent increase is among the Jewish population. The latter fact is startling since the Jews in pre-war times showed a low rate.

Other interesting chapters deal with such topics as a survey of the historical background, a discussion of law and life insurance, of the psychology of suicide, and of the prevention of suicide. In the last chapter is a very interesting discussion on the development of the "well-adjusted adult"—the problem facing the psychiatrist, the layman, the parent, the church, the school, etc. The claim of the "necessity for evolving a sound philosophy of life" is one most of the readers will agree to.

Statistical data together with a bibliography are appended. The book throughout is most intensely interesting, shows a vast amount of research and study and careful deductions from the facts obtained. Suicide is a matter of the utmost importance from many different angles, and in this book we have a study which is enlightening and sound. It can be recommended to many types of readers, especially those who are in professions concerned in the social, religious, mental and medical aspects of life. E. W. STEARN

BOOKS RECEIVED

PATHOGENIC MICROÖRGANISMS. 10th ed. By William Hallock Park and Anna Wessels Williams. Philadelphia: Lea & Febiger, 1933. 867 pp. Price, $7.00.

INDUSTRIAL HEALTH SERVICE. By Leverett Dale Bristol. Philadelphia: Lea & Febiger, 1933. 170 pp. Price, $2.00.

AMERICAN RED CROSS TEXT-BOOK ON HOME HYGIENE AND CARE OF THE SICK. 4th ed. By Jane A. Delano. Philadelphia: Blakiston, 1933. 391 pp. Price, Cloth, $1.40. Paper, $.75.

PRACTICAL FOOD INSPECTION. Vols. I and II. By C. R. A. Martin. London: H. K. Lewis & Co., Vol. I, Meat Inspection. 312 pp. Price, $4.00. Vol. II, Fish, Poultry and Other Foods. 250 pp. Price, $3.00.

PHYSIOLOGICAL HEALTH. Edited by Jay B. Nash. New York: Barnes, 1933. 308 pp. Price, $2.00.

GENERAL BIOLOGY. By E. Grace White. St. Louis: Mosby, 1933. 615 pp. Price, $3.00.

CHILDREN'S SLEEP. By Samuel Renshaw, Vernon L. Miller and Dorothy P. Marquis. New York: Macmillan, 1933. 242 pp. Price, $2.00.

POPULAR SCIENCE TALKS. A Series of Popular Lectures on Thirteen Interesting Topics. Volume X. Edited by Ivor Griffith. Philadelphia: Philadelphia College of Pharmacy and Science, 1933. 307 pp. Price, $1.00.

THE HEALTH AND TURNOVER OF MISSIONARIES. By William G. Lennox. New York: Foreign Missions Conference, 1933. 217 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Nutrition Propagandists Take Note—Research that throws some doubt on the marked anti-infective virtues of vitamin A is recounted here. The conclusion seems to be that under ordinary circumstances sufficient quantities of vitamin A are found in the usual diets recommended for children, and that a larger intake of vitamin A or carotene may be undesirable.

CLAUSEN, S. W. Limits of the Anti-Infective Value of Pro-Vitamin A (Carotene). J.A.M.A. 101, 18:1384 (Oct. 28), 1933.

Another Survey of Colds—Over a 3-year period, 3,000 persons reported an average of 2 cases of respiratory disease per year, half of which were head colds only. Another group of students reported 3 colds per year, three-quarters of which were head colds only. Sex differences were not significant but age and seasonal differences were.

COLLINS, S. D. and GOVER, M. Incidence and Clinical Symptoms of Minor Respiratory Attacks With Reference to Variation With Age, Sex and Season. Pub. Health Rep. 48, 38:1155 (Sept. 22), 1933.

Bacteriological Successes and Failures—We Americans are reticent about one thing—our mistakes. This paper by a British bacteriologist dwells as much upon the "boners" made by research workers as upon the glories of their successes. More of this honesty would make us a little more humble and a lot more understanding.

FLEMING, A. The Trend of Modern Research in Bacteriology. J. State Med. 41, 10:559 (Oct.), 1933.

All About Diphtheria Prophylaxis—Clear and concise, this straightforward statement of the principles of diphtheria immunization and treatment should be on the tip of the tongue of every health worker to be passed on intact to uninformed or doubting lay persons.

HARRISON, W. T. Immunization Against Diphtheria. Am. J. Nurs. 33, 10:923 (Oct.), 1933.

Measures of Health Administration—The story of how municipal health department measuring grew introduces the uses of the *Appraisal Form* to sanitarians who may not be readers of our own *Journal*.

HISCOCK, I. V. Principles of Appraising Municipal Health Practice. Municipal Sanitation 4, 10:337 (Oct.), 1933.

Of Interest to Pediatricians—Cod liver oil has little if any value in promoting blood regeneration in anemia. This scientific candor emanates from one of the important oil producer's laboratories. At least, let us give the devil his due.

HOLMES, A. D., *et al.* The Value of Cod Liver Oil in the Treatment of Anemia. New Eng. J. Med. 209, 17:839 (Oct. 26), 1933.

New Resuscitation Method—An ingeniously devised rocking stretcher for the resuscitation of victims of suffocation is described. Its advantages over the Schafer prone pressure method are that greater air exchange in the lungs is effected, its operation requires less effort, and the victim can be kept warm more easily.

KILLICK, E. M. and EVE, F. C. Physiological Investigation of Rocking Method of Artificial Respiration. Lancet 225, 5744:740 (Sept. 30), 1933.

Why Mothers Die—Surveying 285 maternal deaths in New York State, the author of this preliminary report concludes that over half may be ascribed

to faulty management, one-sixth to negligence of patient, leaving about a third in the non-preventable class.

KOSMAK, G. W. A Study of the Maternal Mortality of New York State. New York State J. Med. 33, 19:1143 (Oct. 1), 1933.

How to Teach Health to Children—Some of the advantages of the unit method of teaching health are that students become interested in solving specific health problems, and these problems have to do with living here and now. A practical example of the method is the author's "A Suggested Teaching Unit for Secondary Schools on Tuberculosis and Its Prevention," issued by the Massachusetts Tuberculosis League.

LATIMER, J. V. Unit Teaching in Health Education. J. Health & Physical Ed. 4, 8:10 (Oct.), 1933.

Vitamin D and Dental Caries—Studying the dietary factors in the control of dental caries, the author concludes that ordinary diets are more deficient in vitamin D than in the other vitamins, and that irradiation apparently was a more potent protection against this lack than the administration of viosterol.

MCBEATH, E. C. Nutritional Control of Dental Caries. New York State J. Med. 33, 18:1086 (Sept. 15), 1933.

Venereal Disease Follow-up—Recommendations for an effective city-wide social service for venereal cases, based upon a painstaking survey of the situation in one city (Boston), are no doubt applicable to most other cities in the United States.

MORRIS, E. H. Clinic and Field Agency Relationships in Syphilis and Gonorrhea Clinics. New Eng. J. Med. 209, 15:735 (Oct. 12), 1933.

Betel-nut Chewing Exonerated—Betel chewing is always listed among the exciting causes of cancer in the East. But it appears that betel is chewed throughout India whereas the cancer area is localized in the tip of the Indian peninsula. This observer believes the exciting causes are not betel but the practice of holding a quid of shell lime and particularly vile tobacco in the mouth over long periods of time.

ORR, I. M. Oral Cancer in Betel-Nut Chewers in Travancore. Lancet 225, 5741: 575 (Sept. 9), 1933.

Growth in Times of Stress—In Hagerstown, a typical small urban community, the average of the weights of children was not substantially different in 1933 than in the predepression years 1921 and 1927. From the facts presented it is concluded that in this community those most in need of aid are getting sufficient food to maintain a reasonable standard of nutrition.

PALMER, C. E. Growth and the Economic Depression. Pub. Health Rep. 48, 42:1277 (Oct. 20), 1933.

What Poverty May Be Doing for Illness—Morbidity statistics, that we hope will forever put a damper upon the "what a healthy country we are" propagandists who have been so vocal since the business depression began, are provisionally presented in this preliminary report of a tremendously significant illness survey.

PERROTT, G. ST. J., *et al.* Sickness and the Economic Depression. Pub. Health. Rep. 48, 41:1251 (Oct. 13), 1933.

Chemistry of Nutrition—Excellent as a background for reading or discussion is this review of the scientific research leading to our present knowledge of nutrition. An invaluable panacea for vitaminophobia, mineralorrhea or milkitis.

SHERMAN, H C. A Century of Progress in the Chemistry of Nutrition. Sci. Month. Nov., 1933, p. 442.

Contributions to Tuberculosis Case-Finding—Three allied papers on tuberculosis report upon Massachusetts

studies. One warns against waiting for symptoms in school children; the second points to pitfalls in X-ray interpretation; and the last to the improvements in the technic of treatment urging more widespread use of collapse therapy.

POPE, A. S., *et al.* Pulmonary Tuberculosis in Adolescents With Special Reference to Frequency, Diagnosis and Prognosis, etc. New Eng. J. Med. 209. 16:765 (Oct. 19), 1933.

Protecting Workers From Radio-Active Paint—Painting watch and clock dials with radio-active paint may be made safe if putting the brush in the mouth is prohibited, the material adequately protected, the factory kept really clean and well ventilated, and only cleanly workers employed. Specific directions are given.

SCHWARTZ, L., *et al.* Health Aspects of Radium Dial Painting. J. Indust. Hyg. 15, 5:362 (Sept.), 1933.

Newer Knowledge of Pneumonia—In this series of three papers there are presented: the prevalence of specific strains of pneumococci in contacts as contrasted with the general population; the taking of specific treatment measures to rural communities and the success achieved thereby; and the latest information on types and typing. We would do well to study all three papers.

SMILLIE, W. G., *et al.* The Epidemiology of Lobar Pneumonia, etc. J.A.M.A. 101, 17:1281 (Oct. 21), 1933.

Effects of Ionized Air—Should you fall under the spell of an "air ionizer," remember this conclusion: "under the conditions of the present experiments nothing definite was found to justify the use of artificial ionization in general ventilation." More extensive and critical experiments are under way.

YAGLOU, C. P., *et al.* Observation on a Group of Subjects Before, During and After Exposure to Ionized Air. J. Indust. Hyg. 15, 5:341 (Sept.), 1933.

NEWS FROM THE FIELD

THEOBALD SMITH GETS ROYAL SOCIETY PRIZE

THEOBALD SMITH, pathologist, of Princeton, N. J., was announced as the winner of the Copley Medal, awarded by the Royal Society, Great Britain's oldest scientific organization.

Dr. Smith was honored for his original research and scientific observations on the diseases of animals and men. He is 74 years old.

The London award tops a list of scientific honors bestowed upon Dr. Smith during a long scientific career. He received the Sedgwick Memorial Medal of the A.P.H.A. in 1930.

He was formerly in charge of pathological work with the U. S. Department of Agriculture. He was Professor of Comparative Pathology at Harvard University from 1896 to 1915.

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

THE Association of Women in Public Health met at the Claypool Hotel in Indianapolis, Ind., October 8 and 9, as an affiliated organization of the American Public Health Association. A short business session was also held after the annual dinner and the following officers were elected:

President—Dr. Ada E. Schweitzer, formerly Director of the Child Hygiene Division of the Indiana State Board of Health

Vice-President—Dr. Ellen S. Stadtmuller, State Director of Child Hygiene, California

Secretary — Pauline Brooks Williamson,

Chief, School Health Bureau, Welfare Division, Metropolitan Life Insurance Company, New York, N. Y.

Treasurer—Dr. Grace Wightman, Chief of Child Welfare Bureau, State Department of Health, Springfield, Ill.

The following women were asked to serve on standing committees: Dr. Mary R. Lakeman, Boston; Dr. Clara E. Hayes, New York; Sally Lucas Jean, New York; and Mrs. Walter McNabb Miller, New York.

The Health-Know-Meter, which was prepared for the International Congress of Women held in Chicago in July was featured as a part of the Educational exhibit at the American Public Health Association meeting.

CHEMICAL LITERATURE TO BE COÖRDINATED

THE International Office of Chemistry has recently been created with headquarters in Paris with the following purposes: to render accessible to interested persons the existing literature of chemistry, to facilitate the registering, filing and diffusion of the literature now in course of production, and to insure coördination between documentation in chemistry and that of other fields of scientific knowledge. The address of the new organization is 49, Rue des Mathurins, Paris 8.

STUDY OF TYPHUS IN ALABAMA

A CAMPAIGN for the eradication of typhus is being launched in ten or twelve counties of southeastern Alabama, it is stated. The U. S. Public Health Service, with headquarters at Dothan, is conducting a study to determine the best methods of prevention and control of the disease. Dr. Adolph S. Rumreich is assembling the data.

ROCKEFELLER FELLOWSHIPS

THE Rockefeller Foundation has granted fellowships for a year's study at either Harvard or Johns Hopkins University medical schools to the following full-time county health officers:

Dr. Norris C. Knight, Sunflower County, Miss.—Member A.P.H.A.

Dr. Cecil J. Vaughn, Holmes County, Miss.—Member A.P.H.A.

Dr. Alton R. Perry, Washington County, Miss.

Dr. Millard C. Hanson, member A.P.H.A., of Mansfield, Ohio.

MALARIA LIBRARY

A MALARIA library was founded in Rome by the Stazione Sperimentale per la Lotta Antimalarica in 1925, and an *Index to Malaria Literature* is issued annually by the Station.

To make this as complete a central malaria library as possible they appeal to all malariologists to send books, reports and articles on malaria.

Photostat copies of any articles in the library can be had, on request, at cost production.

All publications and requests should be addressed to " The Director, Stazione Sperimentale per la Lotta Antimalarica, Corso Vittorio Emanuele 168, Rome (16)."

CHILD LABOR DAY

FOLLOWING its custom of nearly thirty years, the National Child Labor Committee has designated the week-end of January 27–29 as the period for the observance of Child Labor Day.

It is estimated that the industrial codes have released 100,000 children under 16 years from industry. Another 30,000 boys and girls 16 to 18 years have been removed from especially hazardous work. On the other hand there are still approximately 240,000 children under 16 years working in occupations not covered by codes. These children are employed largely in industrialized agriculture, such as the production of sugar beets, cotton,

MEDICAL LIBRARY

tobacco, and truck farm products, in street trades, especially newspaper selling, and in domestic service. The National Child Labor Committee, 419 Fourth Avenue, New York, N. Y.

PERSONALS

DR. LEROY A. WILKES, formerly of the American Child Health Association of New York, is now Executive Secretary of the Medical Society of New Jersey, with offices in Trenton.

DR. EUGENE C. PECK, member A.P.H.A., has been appointed Health Officer of Garrett County, Md., and also Deputy State Health Officer. Dr. Peck was formerly Assistant Health Officer of Newton, Mass.

DR. HENRY D. CHADWICK, member A.P.H.A., recently resigned as controller of tuberculosis of Michigan to become Commissioner of Public Health of Massachusetts, at Boston.

ROSS L. GAULD, M.D., of Jonesboro, Tenn., member A.P.H.A., has been appointed Health Officer of Maury County, Tenn., to succeed Hainan C. Busby, M.D., member A.P.H.A.

EDWIN T. RAMSEY, M.D., of Clark, S. Dak., member A.P.H.A., was elected President of the South Dakota Health Officers' Association at the annual meeting in Huron in October.

JAMES GEORGE MCALPINE, Ph.D., of the U. S. Public Health Service, member A.P.H.A., has been appointed Director of Laboratories of the Alabama State Department of Health to succeed the late Dr. Leon C. Havens.

DR. MORLEY B. BECKETT, formerly Health Officer of Isabella County, Mich., member A.P.H.A., has been appointed county field agent for the Michigan State Department of Health, largely for the study of the full-time county and district health departments.

DR. FREDERICK J. SWIFT, member A.P.H.A., has assumed his duties as Deputy Health Commissioner of Iowa, with offices at Des Moines. He succeeds Dr. William W. Johnston, F.A.P.H.A.

CONFERENCES

February 5–9, 1934, Third International Heating and Ventilating Exposition, Grand Central Palace, New York, N. Y.

Spring, 1934, Statistical Conference, International Statistical Institute, London, England.

March 29, 30, 1934, Annual Meeting of the American Association of Pathologists and Bacteriologists, Toronto, Ont., Canada.

April, 1934, Southeastern Section, American Water Works Association, Augusta, Ga.

May 9–12, 1934. Sixty-sixth Annual Meeting of the Dental Society of the State of New York, Buffalo, N. Y.

July 24–31, 1934. Fourth International Congress of Radiology, Zurich, Switzerland.

1935, International Congress on Mental Hygiene, Paris.

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EPIDEMIC ENCEPHALITIS

THE three papers and four discussions by Bredeck, Neal, Leake, Hempelmann, McCordock, Muckenfuss and Rivers, constituting the important symposium on the recent outbreak in St. Louis, were published in the November issue of the American Journal of Public Health.

At the request of a number of health officers who wished to distribute the material rather widely, covered reprints have been prepared and are offered for sale at the following prices:

1 to 9 copies, 20 cents
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Antigens for the Complement Fixation Tests

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Bacto-Alcoholic Antigen

Antigens for the Precipitation Tests

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